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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S.

Observe, Compare, Reflect, Record.

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THE

DENTAL COSMOS.

VOL. XLII. PHILADELPHIA, JANUARY, 1900. NO. 1.

ORIGINAL COMMUNICATIONS.

DEVELOPING COMMERCIALISM, DECLINING FEES, AND DISAPPOINTING CONVENTIONS.

BY J. C. WALTON, D.D.S., HOWELL, MICH.

UNCIVILIZED man fishes and hunts. Scarcity of food makes him a fighter. The next step in his evolution finds him in the pastoral stage with his flocks and his herds. He next becomes an agriculturist and ceases to roam about. New relations, new duties, new arts, and new possibilities result. With fixed residence comes the state with its institutions of justice, guidance, and protection. Now develop the trades and commerce. Labor learns to specialize and commerce follows. Men must trade when each makes only one of an article or follows one specialty. He will neither want all the things he makes nor make all the things he wants. Soon is felt the necessity for a medium of exchange, for the trouble is great to travel about to make exchanges. Money is the result,—for this he can exchange everything.

Civilization consists largely in wanting many things, and learning how to make and use them. To be rich man must learn to want, to make, and to accumulate. Ethics consists in perfecting the duties and enlarging the circle of brotherhood. To be respected he must learn the meaning and extent of brotherhood.

The idea of association for mutual help and encouragement among those of allied interests and congenial tastes can be traced well back to the pastoral stage of development. Self-protection and the exercise of the social instinct appear to be the motive. Rules of action were early adopted calculated to protect the members against the aggressiveness of the non-member. In its last development our code of ethics represents the crystal of ethical sentiment existing at the date of its adoption. It was, and is, the creed of those opposed to aggressive commercialism, or taking the initiative in all exchanges.

Contemporary with the growth of modern dentistry has been the growth of the printing press, our free school system, and a thirst for knowledge. Great commercial concerns quickly grasping the happy combination of circumstances demonstrated the practicability of communicating to the world cheaply and surely the desirability of their wares, thus facilitating exchanges. New possibilities then appeared to young men going into dentistry from clerkships and with trading tastes. Quickly by the handbill, the advertisement, or fee card these new dental recruits could announce their willingness to serve, their location, their estimate of their ability, and the value of their services. Then each could cultivate as his field of service any community within reachable distance. Those who had by other methods cultivated circumscribed fields objected to the invasion of their circle of patrons by this self-seeking method. It was at this stage of development that the dental association with its code of ethics came into being. Openly, its object was to stimulate and encourage investigation, and increase the knowledge and improve the practice of its members. Secretly, the hope was that by combining to discountenance this new way of inviting exchanges it would be rendered less effective to non-members.

Our fee system has been traced to the feudal ages by one of fine instincts and chivalrous sensibilities. The acceptance of his "honorarium" by the ignorant but dignified leech has been cited as an example of compensation-getting. Serfdom, however, is contrary to the spirit of the present time. The necessaries of life are not guaranteed by any feudal lord, so to-day the hope that thrills the student of dentistry is of congenial occupation and satisfactory compensation. He is controlled by the same sordid aim as if he were studying the mysteries of manufacturing artificial limbs or jewelry,—he is specializing,—but, like the uncivilized man, the primary object in the expenditure of his energy is subsistence. In the absence of satisfactory remuneration for his effort he is a fighter.

In the advance of civilization the development of specialties and subdivision of specialties has gone on until, for example, three men attending seventy pin-making machines can make 7,500,000 pins per day and place them in papers ready to sell in the shops, where once a workman not educated to the business nor acquainted with the use of machinery employed in their manufacture could scarce, perhaps, make one pin a day, and certainly could not make twenty. So the systematizing of teaching, the perfecting of methods, the improvements in machinery, tools, appliances, and forms of material have likewise revolutionized the practice of dentistry. Prices have declined to one-half, one-quarter, in some cases to one-tenth, the price of a generation ago. Discontent has been manifest in cut-rate advertisements, and in hysterical actions in conventions over the same. Few have accepted lowering prices as a natural economic development consequent upon the evolution of forces which now control the world; or the fact that there is a rational basis for their existence. The time has come, however, when it is well to see that comparisons will be made and competition must not be blindly and fanatically defied, but studied as a sociological question; not be settled by domineering fiat. Incomes cannot be counted upon as constant quantities. Fate is gambling savagely with opportunities, the public taste, and consequent demand. From an ethical or an economical point of view, sociologically, the fittest prosper. Declining fees are the natural outgrowth of economic conditions, and can no more be controlled by associated action than can the tides of the sea.

The evolution of the American dentist has been phenomenally rapid, but along understandable lines. The development of the art has outstripped public appreciation of dental advancement, the great majority never planning to patronize the dentist. The public is responsive to the commercial spirit. Idealists are encouraging a type of dentist quixotic to the masses. The masses are too slowly developing faith in dentistry. Knight-errantry in dentistry and practical commercialism act and react upon each other. Slowly a change of front is coming into definition. Impulsive and sporadic new departures will soon be a thing of the past, but increasing impetus is to be seen in the growth of the profession. The coming type is a matter of some concern. Are we settling into the new epoch now? Has the traditional, "We are a specialty in medicine," ever been the accepted ideal of a majority of dentists? Noble conception! But how many acknowledge the debt we owe it; or cherish the inspiration; or hold in loving remembrance the men who discovered this star of a new birth? What will reputable success be in the future? Will money be the final measure of success? How far can we submit to prevalent specialization? Will the exigency of the future be less stern than of the present? Will the dentist of the future have less anxiety to realize a high cash value for his acquired skill and time than now? Has the childish age of doing little and boasting much passed? Do we begin to realize that the way to assure a proper status is to be deserving of it? Do we realize that dentistry as demanded by the great majority is not a great profession? That the dental office is not a great business institution, comparatively, as not much help is employed, not much money is spent, the revenue is not large, its benefits reach comparatively few homes, the details are within the comprehension of the ordinary intellect.

Does the dentist of to-day get his title-deed to success from the profession or from his patients? To which is he under the greatest obligation? Just as he decides this question he will shape his action. Nine-tenths acknowledge their dependence upon the public and wish to originate, or choose, their own lines of progress and settle with the public their claims to continued patronage.

It is the commercial push that has filled the wilderness with cities and has turned the desert into cornfields. It is the same manifestation of energy in the profession that has placed American dentistry in its leading position in the world. It is the same aggressiveness on the part of the managers of our colleges that is swelling the army of matriculates from year to year,—and, too, this activity is not accepted by the world as an evidence of depravity.

Chivalry, in its beginning, sprang from the noble instinct of the strong men to guard their homes and their own. The commercialism of to-day is but modern chivalry. Its blessings are as obvious and striking as of the chivalry of any age. Much advance is being made in ethical methods of securing public attention, but there are still grievous problems to be solved. The code ideal of each cultivating a circumscribed area for himself is yielding to the commercial ideal of all cultivating a common field. Increased facilities annihilate time and aid concentration of energy. Technical education, increased facilities, and concentration of energy are the improved weapons of modern chivalry.

It must be apparent to the student of affairs that there is in the world a leveling force which is continually operating to reduce the value of what has been inherited or accumulated, and enhances our ability to serve the ideas of the living present. The dental student of to-day inherits the accumulated experience of former dentists. Recorded in our text-books, which a few dollars will buy, are the facts which the public expects a dentist to know. The rise in the world's confidence of the average dentist is admitted by all. This rise in professional and social importance has been by the steady action of this leveling force; but those of the grade required by our colleges to educate into dentists are very plentiful. A man with the requisite amount of ability and capital does not rate high. The average factory operative's pay is, perhaps, $1.25 per day, and the average man will make a dentist. Will the leveling force which is relentlessly at work bring the average dentist to the average man's profit?

The education of young men for dentists is now going on at an unprecedented rate, and all attempts to exclude them from participation in the demand for dental service by limiting methods of soliciting by codes, or the application of odious epithets, as "Biled Rubber Man," "Cheap John," etc., are foredoomed; even a temporary success would contribute to ultimate failure. In the early days of dental associations an effort was made to fix and control prices, but the principle of co-operation for mutual defense is always monopolistic, and if allowed full control would compel high prices. The insincerity between the published object and the poorly-disguised hope has done dental societies little lasting good. It is safe to predict that neither the organization of societies nor legislation to which we are now hopefully turning can change the leveling process. The reduction in the average fee has come by increasing the supply out of proportion to the demand for dental service. The same law that produced this effect will not cease to operate in the future.

So the disappointment of those who selfishly turn to the state society for protection from declining fees or from forbidden methods of soliciting may be premised. The society's exclusive atmosphere is not congenial. Its social and educational advantages are not appreciated. The large majority will not pay the price and accept the restraints of organization for the benefits received. The law of economics rules here as in all exchanges,—if dentists must pay for more benefit than they experience, they will decline to make the investment or renew it.

The most promising hope lies in educating the public. It must learn to want more and better dentistry. The society should be the leader in this matter. Increased knowledge of dental possibilities and benefits insures an increased demand. Increased demand means proportionally better prices in dentistry as surely as in the stock market. Dentists would quickly recognize such a benefit from associated effort, and quicker lend their names and presence to their state society. Nothing is gained by a blind denunciation of the commercial methods which are creeping into the professions. It contributes nothing to a solution of the problem. It is idle to oppose the lasting forces which have controlled to the disadvantage of the ultra-ethical. Dentistry has passed through many changes in its progress from primitive conditions to its present state of fairly exact knowledge. The changes have invariably brought blessings to the race. We have thus been perfecting the duties and enlarging the circle of brotherhood. This, in its broadest sense, is true ethics. We may, therefore, look with some degree of confidence to the future. We know from the past that change is the order of life. We may hope that this change in the fee prospects for the future, which is working itself out slowly, but inevitably, by economic laws, will on the whole, or for the public at least, operate beneficently; which must please the philanthropic.

A PROFESSION OR A BUSINESS?

BY WALTER H. NEALL, D.D.S., PHILADELPHIA, PA.

(Read before the Pennsylvania State Dental Society, July 11, 1899.)

THIS question may seem hardly necessary, at least to you who are within sound of my voice, and yet during the last few years there has sprung up in the midst of the profession an element of trade, sordid, grasping, and mischievous, that stares us in the face with a brazenness and an effrontery as did Goliath of old sneeringly meet the clear-eyed, honest, fresh-complexioned David.

Both were men; yet in one were found grossness, brute strength, and utter disregard for right or principle. In the other were personified refinement, moral courage, and a firm adherence to truth and precept.

And so, at this late day, a modern giant has come forth to battle for supremacy in the ranks of refined, cultured dental art; a giant that sets at naught tradition and sentiment, and seeks to drag an honored profession in the dust and tumult of sharp practices and questionable business dealings. Though many-sided, this giant springs from one source, and has its growth and strength in advertising as a means of acquiring money to the sacrifice of all else.

It is not the purpose of this paper to attack an individual, a concern, or an institution, but simply to place the facts before the profession at large, and ascertain whether these dentists, so called because they hold diplomas, are proceeding on right and proper lines.

So much is heard of professional ethics, sentiment, etc., as jealously used by the conscientious practitioner, that the time seems ripe when these rules of ethics (an imaginary code, or, if formulated, not generally known) and this sentiment should now assume an aggressive form, and by their powerful influence move upon the enemy's works and disperse and scatter their forces forever; the money-making schemers, the combination shops of cheap workers, and the perverters of the art of dentistry, an art which requires such patience, tact, skill, and discrimination. There are callings which must always be above the ordinary. The judge in his dignity dare not stoop to pettifoggery, the preacher must not lower the standard of his sacred calling, or the physician step from his exalted pedestal to quackery; to each would come disaster and disgrace.

And why should the dentist be encompassed by catchpenny devices, flaring, misleading advertisements, or cheap work by cheap means?

As the Gulf Stream's influence is felt far out at sea, and often in the most unexpected places, so the "cheap basis dentistry," as it is called, has a wide range. At first it made but little impression; people laughed at its wholesale methods; the conscientious dentist elevated his eyebrows at its "clap-trap;" but, like the dandelion of the field, it grew and multiplied; for as one business man observes what a *good thing* his neighbor has, he immediately embarks in the same scheme, and "dental parlors" and "palatial offices" began to flourish like the green bay tree. Then the public puts on its thinking cap.

"Have I been cheated all these years?" "Has a false valuation been placed on the work done by my dentist?" or "Is not dentistry, after all, but a mere business, operated by rule, measure, and the length of my pocket-book?" are the propositions first under consideration.

The steady-going, ethic-loving dentist begins to look serious as question after question is propounded to him, such as "How is it that this firm advertises to make sets of teeth for half that you do?" or, "Why don't you reduce your prices on gold and amalgam fillings? I see it advertised that the best work can be obtained at much more reasonable rates than yours;" or, "Why is it that you charge so much more for crown- and bridge-work than the 'white-enamel dentists' or the 'plaster-working dentists' do?" Or, again, "It is very strange that you do not sanction and employ some of the harmless obtundents which produce such wonderful results that I see noted on Dr. So-and-so's card."

The best of people will read advertisements, and the best of people will ofttimes ask embarrassing questions.

Then follows a lengthy and tedious discussion on the part of dentist and patient, with the result sometimes that the former is not quite easy in his mind that he has brushed away all of the erroneous impressions a well-worded advertisement has generated, and the latter has a half-notion still remaining that there is a good deal of truth in that advertisement after all, in spite of the powerful arguments to the contrary. This may seem irrelevant before such an assembly of representative dentists, but, gentlemen, however strongly you are intrenched, you cannot escape it; it is like the rain from heaven, it falls upon the just and the unjust alike, and so the influence of this system of cheap dentistry reaches you.

Some may be safely housed, as it were, administering to a rich clientage; others may be beneath an umbrella, merely getting that which is blown in; while the great majority, it can be safely said, must stand the storm. They receive it in all its fury, and many take refuge by employing the same methods and means themselves; they reduce prices, set at variance established customs, and advertise promiscuously. Thus we have the advertising dentist. The "combination shops," the "Kamtschatka Dentists," and the "White Alloy Dentists" are quite another feature.

It may not be generally known how such schemes are promulgated.

An individual with a plethoric pocket-book and an eye to business conceives the notion that money can be made out of dentistry, if the scheme is judiciously "worked"; "worked" is the word in this instance. Immediately an overseer, a dental graduate, and that is imperative, is engaged. This overseer employs a number of recent graduates, and even dentists of long standing, who have been struggling for an existence, are gathered into the fold. A large room, or a suite, in a favorable location is secured, fitted up attractively, and stocked with the various implements of dental use.

This concern, as started, has no prestige. Then comes the newspaper advertising, the handbills, the dodgers, the cards, and the personal letters, and "trade"—this word is used in its harshest sense—is drummed up and presently it flows in, and incidentally the shekels also, for "no trust" is the ironclad rule; "so much down or no work done."

You might advise letting this matter alone, arguing that these concerns will come to the end of their string. Certainly, but the string seems to be an exceptionally long one, and the end is not yet in sight.

It has further been averred that these advertising individuals and their cheap shops do no harm; that they benefit the poor, and save many teeth that would otherwise be lost; and, finally, it has been advanced, maliciously it is true, that they act as a sharp prod in the side of the high-priced dentist. Let us make a little investigation. Do they perform cheap work? Yes and no. Cheap? Yes, because of poor material, inferior methods, and faulty workmanship, although the latter, in isolated cases, may be above the ordinary. Cheap? No, for the simple reason that a dentist cannot honestly and conscientiously give of his brain, of his services, for a mere pittance.

This being the case, he will resort to means or methods calculated to fill his purse at the expense of his patient. It must be so; in fact, it is so, for when pulp treatment, abscess treatment, the grave consideration of pyorrhea alveolaris, and similar affections are presented, the man of the money-making proclivities wants none of it. His great hold is for quickness and dispatch; therefore he resorts to needless extraction, necessitating the wearing of artificial dentures, and also to the use of crown- and bridge-work to a shameless extent.

The ordinary gold fillings are attempted, of course,—fillings that are conspicuous, attract the eye, and flatter the vanity of the patient. But cases that require systemic treatment, cases that involve time and patience in order to secure a proper and complete cure, are not entertained for a moment, because the entailed bill would be of such proportions that the advertised cheap method would not appeal to the patient's pocket-book at all, and thus the ends of the *business* dentist would be defeated.

Hence, the patient, after all, is paying dear for his dentistry, in that he may lose or have maltreated organs which could have been saved for the better comfort of himself and to the greater benefit and beauty of his facial expression. Besides this, the artfulness resorted to for making shrewd bargains must also be considered. The worker in cheap dentistry, the one who advertises his wares, sizes up his customer, as it were, has a convenient sliding scale. To the well-dressed, above the ordinary looking personage he says,—

"Oh, yes; we *do* make plates for three dollars, of course; but these we do not guarantee; they would not suit you at all. Now, here is an article fully guaranteed; this will cost you twenty dollars, and with gold attachments thirty-five dollars." This is an actual fact. Filling-material is treated in the same manner. And so the price is put on or taken off, as the case warrants it. The charging seems to be regulated by a kind of a "cheap work" dental thermometer, as it were, in which the mercury, representing the prices, rises or falls to an alarming degree, according to the indications presented by the patient.

Now, in regard to this species of dentistry being "a prod in the side of the high-priced dentist." It possesses as much influence as does the sting of a mosquito or the prick of a brier; both are irritating, that is granted, but neither are of sufficient moment to cause one to alter his ambitions or aims.

A delightful, novel sensation is certainly experienced when a blue-coated colored gentleman, resplendent in gold braid, with the legend "painless dentistry" across his cap, pokes a card at you bearing the startling headline, "Your teeth need attention!" Of course you read on, and are further informed that "our work is cheaper than the cheapest." "Our white porcelain fronts are better than natural teeth." "Our seamless, tubular, 24-k. reinforced gold crowns are known the world over." "Our gold fillings are made of real gold." "We absolutely do work for nothing." Or you may be confronted by a grinning wax figure in a show window, with mouth displaying alternately a set of teeth broken down, decayed, and repulsive, and then a perfect denture of faultless symmetry, with a card attached stating that "A set like this, $5.00."

Other examples are not wanting, and they are all authentic:

"A barrel of flour with every one hundredth tooth extracted."

"When others fail, come to me."

"When teeth are ordered, no charge for gas."

"Teeth extracted without pain."

"Teeth repaired while you wait," on the same line that "shoes half-soled and heeled in fifteen minutes."

"Bring this advertisement and get a discount," on the same principle that "save your cigarette coupons and receive a prize."

"Car-fare refunded" or "car-fare paid within a radius of one hundred miles."

"Sets guaranteed for ten years." How guaranteed? Guaranteed against what? You learn nothing more from the advertisement.

"Every lady patient receives a theater ticket." Analogous to "A chromo given away with every pound of tea," or "A watch goes with every suit of clothes."

The following are the exact words of a good dentist and a clever worker:

"Originally I started the practice of dentistry with 'sentiment' as my guiding star; now I have pocketed 'sentiment' and am after the money that there is in the 'business.' "

He is doing well; his coffers are full; his home shows the evidence of what money can do, but his office front is placarded with gilt signs, carved tooth symbols, and specimens of dental laboratory work. Another makes the announcement that "on Thursdays one tooth extracted free." He evidently expects to extract more than one, the first being merely a bait to pave the way for other work. And again is noted a dentist who advertises that he is a graduate of one of Philadelphia's colleges (name given) and a licentiate of the state of Pennsylvania. Probably not feeling very secure in his position, this dentist needs the influence of his *Alma Mater,* as well as the prestige of the commonwealth of his state, to bolster him up. The following was clipped from a Philadelphia paper of February last: "The manager of a London musical hall announces that any one who purchases a ticket for the performance may have his or her teeth extracted for nothing." Whether this was a scheme concocted by the theatrical manager or a shrewd stroke of business on the part of a dentist the clipping sayeth not; probably a combination.

And lastly, horror upon horrors, the club system has been foisted upon us, and one can now pay so much a week and stand the chance of being the lucky (?) individual to receive the benefit of the first disbursement. Have dentists the right to advertise? Unquestionably, yes. Is it right? Unquestionably, no. And further, there is no law, more the pity, that will prevent a graduate advertising the fact, for pecuniary gain, that he received his degree from such and such a college. A college's fair reputation is thus left open to be used and turned to profit by methods frowned upon by the profession at large, and yet the institution is utterly powerless to help itself. Do you not see the possibility, nay the *probability,* of the future?

The foregoing has been presented to you in rather a humorous strain, but, gentlemen, the matter has really assumed serious proportions. Let us consider what a dentist loses who advertises. He is ostracised from attending or joining dental societies; he cannot become a member of a dental convention, or participate in any of its debates or transactions; he forfeits the friendship of the profession; he is not wanted or is not tolerated in dental social clubs; he is ineligible to serve on the state board of dental examiners; he cannot become a teacher in any school or college of dentistry; the reputable dental journals will not publish any of his communications, no matter how able they may be, and if he *is* an educated man he can but simply gather up the crumbs that fall from the table of the feast within. He is free, of course, to subscribe to the current dental literature; he may procure copies of society transactions, and there is nothing to prevent him from purchasing text-books, but that is all. He cannot feel the warm grasp of friendship and good-fellowship; he cannot hear the words of wisdom and thought as they flow from a learned speaker's lips, nor can he enjoy the privilege of debate, the social intercourse of the meeting room, and the exchange of opinion so precious and helpful. These are denied him. The crumbs must suffice. In fact, the advertiser inhabits a world of his own. Legally he is within the dental profession, morally he is as the froth that is cast up by the mighty ocean.

Remedial agents.—All diseases have, or should have, a remedy, though all remedies do not cure. In this instance several antidotes may be employed, ranging from the most gentle to the most severe. The first is to be administered before the disease has taken root,—to the student in the dental college, to which he has pledged his allegiance. And the essayist is particularly fortunate in having the opportunity of speaking of this phase of the matter in the presence of so many teachers of dentistry.

If the mild prescription fails, then should follow the stronger dose, as the disorder increases and ramifications appear in every city, town, and village. If the malady is not checked, what of the young graduate as he steps into the arena of life, confronted on every hand by those who are tainted with the advertising practice? What hope is there for him? He must either struggle bravely along, with virtue as his reward, or go and do likewise.

The fine points of building up a practice is to him a thing attended by difficulties and hinderances. Remove these difficulties and hinderances, whether they be the flaunting advertisements and catchpenny devices of "cheap dentistry" or the allurements held forth for patronage from the clinic room of the dental college, and probably the very college from which he received his diploma; then the young practitioner will be enabled to carve an honorable name for himself, as well as receive an incentive calculated to serve the best interests of humanity.

There is no gainsaying the fact that the tendency toward charlatanism, clap-trap, and the working of advertising schemes should be ever cried down and strongly discouraged, and especially by those who come into intimate relation with the student, whether they be lecturers or demonstrators. This cannot be too vigorously urged. Hence it necessarily follows that the teacher, as well as the institution which he represents, should be free from the vice in *any* of its forms. If one teaches strict abstinence in regard to advertising, it certainly would not be consistent for his college to seek patronage through the press or by circulars, though the subject-matter be carefully worded.

This simply acts as a seed planted in fertile soil, and it will surely grow; and later the young graduate may argue that "my *Alma Mater* advertises in the newspapers; why, then, have I not the right to follow so good an example?" In fact, there is nothing to prevent him inserting his advertisement immediately below that of his college, and, if he so desires, using identically the same words.

"Ah, but there is a difference," the argument is advanced. "One is simply advertising to maintain the clinic room, while the other is—— is——."

Here there is a pause. Is what? The essayist will supply the deficiency. The other is advertising in order to keep soul and body together. Both are after business; the ultimate ends of both are similar; the public makes no distinction. The college whose clinic rooms are without patronage is just as useless as a dental office without patients.

Then, again, it would be incongruous for an institution or college to observe rigidity in the matter of advertising; denouncing it strongly, and yet allow any of its teachers to publish to the world their ability as dentists or the cheapness of their prices. But recently a competent demonstrator was forced to resign from one of the prominent dental schools because he refused to discontinue the practice of distributing pamphlets calling attention to his workmanship and moderate scale of prices. His mode of wearing the garb of a dentist was in direct opposition to the teachings of the college with which he was connected. He preferred advertising to teaching, and his resignation from that institution of learning followed as a matter of course.

There is yet another method to be applied to the young seeker after dental knowledge. It is the influence of his preceptor. If he be a stickler for the unwritten laws of dentistry, all well and good; then the case in hand will progress nicely, and there is no danger of a relapse, shall it be called? The subsequent college course ought to strengthen the student and put him beyond contamination or temptation. But if the student has been under the influence of these advertisers, these get-rich-at-all-hazard fellows, or has been brought up in commercial life, or knows no sentiment other than that dentistry is a money-making profession, then, like a case for regulation in which the patient is brought to you when too late for preventive measures, drastic methods must be employed, and in the college, the class-room, must the treatment commence.

Heroic measures.—Now, whether legislation can be secured to abate or eradicate this bugbear of the dental art is a much mooted question. Some years ago a law was formulated and passed making it necessary for every dentist to have his diploma registered.

We have moved in the matter of dentists practicing without a diploma; we have promulgated a law making it absolutely necessary for every recent graduate to stand a *further* examination before a state examining board; a good and just enactment, by the way. And so cannot a law be framed and passed that would cause the relinquishment of the diploma if the graduate should advertise or resort to practices antagonistic to the code of ethics?

I repeat, is it possible to pass such a law?

Opinions differ. This is a free country, and if a subject does nothing against its laws that subject has a free and unrestrained right to think, to talk, and to act.

Can a man be prevented from advertising? Unfortunately for us as dentists, no. Has any one the right to dictate what he shall receive for services rendered? No again.

Here, then, we have two principles involved. In the first instance the advertising, in the second instance the regulation of prices.

As regards advertising, it seems entirely within reason that it could be adjusted by law. The dental profession is a justly proud and honorable one; one of scientific research, in which the healing of some of the ills of mankind is its constant study. Therefore it is entitled to live upon its merits, and not to be harassed and belittled by bombastic advertising.

With respect to charging, an embargo cannot be placed upon that. It is a matter of conscience. Every dentist is the judge of his own ability and the worth of his services. If one is so placed that enormous fees are a matter of course, he is to be congratulated. If another barely gets living prices, he is to be pitied. Both may have ability; both may have tact; both may be of good address, but one is fortunate, shall it be said? while the other,—well, probably he has not grasped the opportunities presented, or risen to the circumstances. Laws cannot be enacted to lower the prices of the expert practitioner to the level of the dentist of mediocre ability; neither can laws elevate the careless to the plane occupied by the skillful and successful. Here, then, the legislative pill would make but half a cure, regulating the advertising, but not the charging.

The dental laws of recent date have certainly had a salutary effect upon those practicing dentistry who had no right so to do, but they fall short in being perfect, as they do not prevent or restrict certain individuals resorting to pernicious advertising after graduation, which is just as reprehensible as practicing without a diploma.

Increasing the years of study of the student at a dental college or school will not remedy the existing advertising evil, for as soon as the graduates step into the world, armed with diplomas, they are on the market, as it were, and a tempting offer from a "cheap dentistry promoter" would certainly be a God-send to many of them. In fact, the way has often been already paved for the graduate, in that he may have been employed during his student years in an advertising office or concern.

The corrective measures here indicated are for the dental colleges to refuse to matriculate any person who is connected in any manner with an advertising dentist or establishment. And, further, that the student shall be required to give a pledge that he will not put himself under the guidance or in the care or employment of any one who advertises in dentistry.

The complete cure might be effected by the stable practitioner openly ignoring the reprehensible conduct of his erring brethren; the societies might publish resolutions against all forms of dental quackery; the conventions could certainly add their strong and powerful voices in support of the others; the dental colleges have it in their power to mold and train the student, while all, in combination, could undoubtedly secure the potency of the law.

Would this not be beneficial? Would it not further raise the standard? Would it not prevent cheap, advertising, misleading dentistry?

Let the foregoing be answered by propounding another question. Would a few clods of earth turn the course of a river? Not one iota. But systematic dredging and proper trenching would certainly do so.

Alone, nothing can be accomplished; so a general assault upon the lines of dental abuses by the dentist, the society, the convention, the college, and the law must surely check this advertising, cheap dentistry tendency.

Can this highly unprofessional conduct be reached? Or is it worthy that the profession recognizes the fact that it exists, and, if so, what measures shall be taken to effectually cause its suppression and final extermination?

These are questions yet open for debate.

THE URIC-ACID DIATHESIS.

BY DR. W. D. DE LONG, READING, PA.

(Read before the Pennsylvania State Dental Society, July 11, 1899.)

THE baneful effects of an excess of uric acid in the blood are now recognized in nearly every department of medicine, including that of dentistry. The literature of medicine during the past few years has fully shown this. Indeed, very much attention has been given to this interesting waste product of the economy, and as a result of these observations and labors, this product is charged with being the cause of a very large number of diseases.

The conclusions and declarations of the most enthusiastic of these men are so emphatic and new that it is somewhat startling, and already they are being denominated as cranks, or having arrived at conclusions without proper or true premises. It is claimed by some that in a state of civilization we are all, after puberty, more or less gouty, and we are gouty in a gradually increasing ratio.

What do we mean by the term diathesis? This term is applied to an inherited predisposition to alterations of nutrition. Nutrition has been defined as the transformation of non-living molecules into living cells, which undergo chemical changes with oxygen, producing waste material that in time is thrown off to make room for fresh cells. Nutrition is modified by age, sex, food, and environment, such as variations of climate, occupation, manner and custom, hygienic conditions, etc. Continuous subjection to any of these conditions modifying nutrition becomes apparent in the progeny of individuals; and this functional alteration of nutrition causes a predisposition to pathologic conditions, or a pathologic condition itself, known as diathesis.

Two diatheses at least are now admitted,—the scrofulous, or a predisposition to the deposit of tubercle, and the arthritic, or a predisposition to diseases caused by disturbed process of nutrition.

The term uric-acid diathesis is, strictly speaking, only one phase or subdivision of the general term arthritic diathesis. Under this latter head are included, as before stated, all diseases due to faulty metabolism, such as obesity, all calculi, whether biliary, renal, or pancreatic, the two forms of diabetes, all varieties of rheumatism, gout in all its phases, anemia, eczema, neuralgia, asthma, paralysis, hysteria, Bright's disease, etc.

Uric acid is one of the organic acids formed in the economy, and is distinctly a product of the animal organism. It has never been formed by artificial means. It is found in the urine of all classes of animals, occurring even in the very lowest orders. It is found in the excrement of birds, snails, reptiles, and insects.

Uric acid was discovered by the German chemist Scheele, in 1776, and was at first thought to occur only in urinary calculi. In 1797, twenty years later, Wollaston showed that gouty concretions were composed of a salt of this acid-sodium urate.

The question of its formation in the economy has engaged the attention of pathologists ever since its recognition. Only of comparatively late years has its importance and its relation to a number of pathologic conditions of hitherto unknown origin been appreciated, and there is at this day a difference of opinion as to its formation and causative influence in certain morbid manifestations.

The great Fothergill and Garrod taught that uric acid was formed by the metabolism of nitrogenous waste; that it represents a lower degree of oxidation than urea, and that the liver was the organ in which the process of formation was carried on.

Haig, of London, in his masterly treatise on uric acid, if not quite, at least largely accepts this theory, while others hold that it is formed in the kidneys or blood. It is generally agreed, however, that the greater part of the acid is derived from the nitrogenous elements of the food,—the proteids.

The position that all of the uric acid comes from the nitrogenous ingesta, or that it is the exclusive factor in the causation of the diseases referred to above, cannot be maintained to-day, for we know that at least some of this product comes from the oxidation of the nuclein of the blood-corpuscles, and that besides uric acid the other xanthin compounds are of importance. There is some relation between the formation of the two waste products, urea and uric acid. In health their relative quantities excreted are constant. If this ratio is disturbed, there is a noticeable deviation from the standard of health. Haig claims that the formation of uric acid has a normal relation to urea of thirty-five to one, that the relation is constant in health, disease, under all diets and medications; that is, a diet, medicine, mode of life, or a morbid process alike increases or diminishes the production of these principles in the ratio mentioned; but that certain dietetic substances, medicines, habits, or diseases have the power of checking not the *formation*, but the excretion of uric acid. If uric acid is the great toxin that is claimed for it by some of the modern investigators, how does it do its baneful work?

In answering this question permit me again to refer to the subject of nutrition. The entire principle of this process, and of excretion as well, depends for its normal working on the uniformity of arterial tension and free and unobstructed capillary circulation.

Oxygen taken up during inspiration, in quantities howsoever generous, is of value as a conserver of life only in so far as its imbibition is followed by uniform distribution to individual tissue-cells. Therefore, any impediment to the normal capillary ebb and flow must be attended with results detrimental or serious. Now the greater harm to the tissues from an excess of uric acid seems to rest on its peculiar power of disturbing this peripheral circulation. Haig claims that uric acid causes contraction of the arterioles, and by virtue of this contraction becomes the prime factor in the pathological changes in every organ and tissue of the body.

He sums up one of his brilliant theses on this subject as follows: "If my premises are good and my deductions sound, and if uric acid really influences the circulation to the extent I have been led to believe it does, it follows that uric acid really dominates the function, nutrition, and structure of the human body to an extent which has never yet been dreamed of in our philosophy, and in place of affecting the structure of a few comparatively insignificant fibrous tissues in which it is found after death, it may really direct the development, life history, and final decay and dissolution of every tissue, from the most important nerve-center and most active gland to the matrix of the nails and the structure of the skin and hair." This is, to say the least, a startling declaration, and we should not forget that Haig is not universally supported in his theory. In fact, as to some of his deductions he stands quite alone, and some are trying to even ridicule him. It is, however, quite a plausible theory, and the agitation it has caused will no doubt be followed by a much clearer conception of the parts played by the various leucomaines formed in the chemical laboratory of the human body, and may result in acquainting the profession with a true interpretation of many of the symptoms now inexplicable.

It is to be hoped that the specialty of dentistry will add its quota to the knowledge of the future on this subject, especially because we have already recognized conditions in the oral cavity claimed to be due to the presence of uric acid or its combinations.

The current literature of our profession contains in nearly, if not quite, every issue a plea for more scientific study by the rank and file of our guild, and in the humble opinion of the writer no subject is of greater interest or can be more universally engaged in than the one under consideration.

The function of the kidneys is to filter and remove from the blood certain deleterious and waste products, among which is uric acid and its salts. These products are removed only, however, when in solution. Uric acid is extremely insoluble in a fluid at a low temperature and of acid reaction, but rather freely so in an alkaline medium.

Under these conditions it is quite easy to understand why all substances which form soluble compounds with uric acid or increase its solubility in the blood should increase its excretion, and why all substances which form insoluble compounds with it and diminish its solubility in the blood should lessen its excretion.

To again quote Haig in reference to this matter, "it is in our power to control the excretion of uric acid by controlling the conditions affecting its solubility and also the quantities directly introduced with the food." In the treatment of this condition, evidently prophylaxis is of the greatest importance. Alcoholic drinks are to be avoided; meats are to be taken seldom and in small quantities. Tobacco also is claimed to be harmful. The immunity to the uric-acid trouble enjoyed by seafaring men is said to be due to the large amount of salt which they consume, retarding the precipitation of free uric acid in the body.

A diet of milk and vegetables with some fruit, and an occasional fish dinner, eggs, and bread should be adhered to for a considerable time. A remedy that is both prophylactic and curative is good pure hot water, and plenty of it, applied both externally and internally. As to remedial agents proper, the alkaline treatment has been the generally adopted one for a long time. The salts of sodium, potassium, and lithium have been used with happy results. Purgatives and laxatives must be employed as occasion demands.

What should be insisted upon, however, as of first importance, is great care as to diet, strict attention to habits of cleanliness, frequent baths and large draughts of hot water, uniformity and warmth of dress, and habits of great regularity, not forgetting the necessary amount of exercise.

SENSITIVE TEETH, ACID FOODS AND WASHES.

BY C. C. HARRIS, M.D., D.D.S., BALTIMORE, MD.

(Read before the Pennsylvania State Dental Society, July 11, 1899.)

HAVING heard considerable complaint of sensitive teeth at the cervical margin, and especially during the last few years, I have been led to inquire into the causes.

It seems to have been my observation that many, and I may say a great many, of these complaints are due to the numerous mouth-washes now on the market, recommended as germicide, antiseptic, and disinfectant.

Patients were questioned as to their health, diet, and mouth-washes; also if the usual brushing had been neglected.

When the diet was of acid character, such as pickles, sour salads, foods prepared with vinegar, tomatoes, strawberries, rhubarb, lemons, oranges, and the like, I naturally advised that such special food be avoided until the sensitiveness was overcome.

To immediately overcome this condition I apply to the surface such agents as carbolic acid, nitrate of silver, and, best of all, zinc chlorid. No one agent is successful in all cases.

Apart from advising the avoidance of all acids, I recommend an alkaline wash, usually suggesting bicarbonate of soda or Phillips's milk of magnesia. This must be used as frequently as convenient, both by rinsing out the mouth and using with the brush, cautioning the patient to brush the sensitive surfaces especially well, and well down to the gums. I always advise that the gums be brushed, and if inflamed to encourage blood-letting, as this is most favorable to a return of health. It is well to recommend a narrow, *well-rounded*, and not a square-edge brush. Several of these patients spoke of using listerine. This agent being so generally used may account for its being mentioned.

One lady came with her mind already made up that the sensitiveness was due to this wash.

It is difficult to understand how this agent causes sensitiveness; yet certain people claim this annoyance only came after its use. My tests have shown neutral to litmus.* A neutral litmus test does not necessarily prove that acids are not used, nor that such do not exist injuriously.

This is because the acid may be counteracted by an alkali, and leave a free acid that may be injurious and yet not show to litmus test. A commonplace and fairly good illustration of this is in the making of carbonic acid gas as used for soda water. Bicarbonate of soda and sulfuric acid are used, the precipitate being sulfate of soda. The gas given off is carbonic acid gas, and used to charge water for the soda fountain. This water is expected to be about neutral, and not turn litmus; yet is often injuriously acid, and acts upon lime substance. This is shown by its eating away and dissolving marble. A slate slab is used where there is dripping, and not marble.

If this carbonated water can eat up marble, it can destroy teeth in time. Tooth-pastes may be injurious, as the moistened consistence depends upon fats or their products, as glycerol. Decomposition of vegetable matter therewith may create lactic acid, and this is most injurious in the mouth. Very few of these mouth-washes are desirable in the treatment of abscesses and disinfecting pulpless teeth, over and above the old-time remedies. Sanitol, however, is especially useful as a disinfectant of root-canals.

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*A circular from the company claims listerine to be slightly acid.

This is an "oily" preparation, and to this oil do I attribute its special virtue and usefulness. Like creasote, the oil is not so readily diluted by the fluids of the mouth. *It remains where you put it.* Of course the oil only holds together the active agents. It is the happiest of all the proprietary agents I have used in treating root-canals and abscesses.

I have tested many antiseptic washes, and find most of them so strongly acid that I do not think they can be wisely used. In Baltimore I recommend Thomas & Thompson's carbolic mouthwash, being familiar with the formula. This contains no acids. Sanitol shows slight acid reaction, but the oil may help to overcome any detrimental action on the teeth. Some of the preparations I have tested and found acid are zymocide, Wampole's antiseptic solution, pasteurine, borolyptol, euthymol, etc.

Among the alkaline washes may be mentioned glyco-thymoline and boro-bornyl. The latter was originally a Baltimore preparation, formulated by a good chemist. I hear it is now put on the market by The S. S. White Dental Manufacturing Company. Sozodont is also alkaline.

I think we can do great injustice to our patients by recommending many of the agents on the market. One thing is sure, we are not consistent when we recommend an alkali such as Phillips's milk of magnesia and advise the same patient to use as an antiseptic one of these strongly acid washes. If one is wise, the other is unwise.

To be on the safe side, let us take a strong stand against acid washes. The makers of borolyptol already recognize the importance of lessening the acid, as recent tests show. Strong alkali is capable of disintegrating tooth-structure, as shown by the criminal case in Chicago where the entire human body was eaten up with an alkali.

It may be necessary to use these acid germicides in treating pathological mouth conditions, but they should be used by the dentist or under his special instruction.

We are guilty of criminal practice when we recommend to a family an acid wash to be used daily and indiscriminately by young and old. For the mouth there is no superior drug to carbolic acid. It is a most excellent germicide and disinfectant. It can be used of sufficient strength to accomplish the object desired and not be harmful. It is doubtful if this statement applies to the acid drugs. Carbolic is misnamed, not being an acid in the common acceptance of the term. It belongs chemically more to the alcohol family.

I have suspended a tooth partly in and partly out of boracic acid, and soon found evidence of softening of dentin, but not of the enamel. Boric acid is supposed to be about neutral, and the most innocent of all the acids. Being often made by the action of hydrochloric acid on borax, it must be selected with great care and tested for hydrochloric acid. Let us avoid acids, and never depend upon a wash for cleansing and whitening the teeth. For this purpose rely entirely upon mechanical and not chemical action. Use a brush and powder with the idea that friction alone must whiten the teeth.

Modern enlightenment makes a mouth-wash essential to the toilet, and many tooth-cavities will be thus prevented if the wash be wisely selected. For a wash use innocent agents like carbolic acid, oil gaultheria, oil cinnamon, oil peppermint, pellitory root, alcohol, and many others.

A point of great interest is that all acids make the teeth sensitive, and cavities are surely made excessively painful by these acid washes. Acid foods have the same effect. Advise your patients to avoid acids, and to use an alkaline wash for a couple of weeks before and while under your care, and they will surely suffer much less. Teeth are less sensitive in proportion to the "frequency" of washing.

I cannot deal with the subject of the profession recommending proprietary remedies beyond a few remarks to the effect that it is within the province of professional ethics and good taste to prescribe such agents when their contents are honestly made known. Modern thought seems to be removing prejudices in this direction. At any rate, many of our best-standing brothers are taking pecuniary interest in such matters. I cannot think such men would lend their names and assistance in the sale of any agent without first thoroughly investigating and concluding it of great and exceptional value. The fact of such gentlemen being so interested should be of assistance to the profession in seeking a mouth-wash for their patrons.

Personally I have not permitted myself to be financially interested in any marketable article. This is a matter of education.

Surely, we must have staple mouth-washes that can be procured everywhere.

I recommend Thomas & Thompson's carbolic mouth-wash because it is my ideal, a harmless and perfect germicide.

Acids help in causing many neuralgias of the face and teeth. They can act locally and systemically. I am quite sure many of the periodic attacks of neuralgia are produced by acids acting on some sensitive tooth-surface or cavity. Fruits and vegetables contain numerous acids, such as malic, citric, tannic, tartaric, oxalic, etc.

Relief comes frequently in a few minutes after washing out the mouth, and particularly prompt when an alkali is used. How often do we hear complaints of even intense neuralgia of short duration. Many of these are due to some acid food, or neglect of the tooth-brush. The extreme acidity soon passes off, and the pain subsides. Apart from suggesting medicinal agents, recommend frequent washing of the mouth, if only to change the fluid conditions. Neurasthenic, rheumatic, and gouty subjects can seldom drink and eat acids with impunity. Pain will often be reflected in a few minutes, and the teeth get more than their share.

Every practitioner should keep strips of litmus paper convenient and test the mouth fluids of each patient, as herein will be the explanation of many troubles, and especially of erosions, sudden tooth-disintegration, and neuralgias.

A patient called this week who came to me a year ago suffering intensely with sensitive teeth, the labial enamel almost entirely gone. She complained greatly of facial neuralgia. I advised Phillips's milk of magnesia, avoidance of acids, and frequent mouth washing. All symptoms soon subsided. To-day the dentin is somewhat darkened, not at all sensitive, no neuralgia, and she is a much happier being. I am confident milk of magnesia would have proven most beneficial taken systemically. When the acid diathesis exists, alkaline systemic treatment should be insisted upon. Oral sterilization requires much more powerful germicides than other ordinary surgical work. All acids tend to increased sensitiveness of the teeth, while mild alkalies have the contrary effect. Therefore, let us avoid artificial acids so far as possible. Recommend neutral, and avoid the extremely acid washes.

I once heard a paper read on digestives where it was stated that digestion likely continues some time after death, and explained how the secretions of the rabbit's stomach may entirely digest itself after death. This gentleman claimed that the mouth acids were *digesting* his gums. They were gradually leaving the teeth. No tartar; healthy, firm gums, and only used his finger in washing his teeth. A stomach specialist made great sport of this statement. The latter using boric acid for everything, used it as a mouth-wash. He called on me this week, and I asked him about his boric acid wash. He explained that his teeth became so sensitive he gave it up, and said further that he was sure the "astringency" caused the gums to leave the teeth. The gums, apparently healthy, have greatly receded. I have frequently recalled this statement of gum digestion, and it may be worth thinking over.

THE PREVENTION OF TOOTH-DECAY.

BY DR. E. NEVINS STUMP, WASHINGTON, D. C.

(Read before the Pennsylvania State Dental Society, July 11, 1899.)

MR. PRESIDENT AND MEMBERS: The views which I have the honor to bring to your notice on the important subject of "Tooth-Decay" are those of a practitioner of dentistry, rather than the student of microscopy or bacteriology.

Allow me to at once declare my position. I hold that acidity is *the* cause of tooth-decay. Granted this much, the question arises,—What is the cause of the acidity? Is it constitutional or local? May it not be either, or even a combination of both? But I shall defer a consideration of this aspect of the question.

Let it once be established that acidity is the cause of tooth-decay,—that they stand to each other in the relation of cause and effect,—it will be but a short step to select the remedy.

It is claimed that the acidity is the result of changes induced by the presence of bacteria. I shall not enter upon a discussion as to the particular forms of bacteria that are potent in exciting tooth-decay. Neither shall I attempt to differentiate between the Leptothrix buccalis and other bacilli found in the mouth, as causative factors in tooth-decay.

I would make a distinction between the condition of abrasion or erosion of the teeth, and the condition where the process is more localized. The secretions, in a case giving rise to abrasion or erosion, are as destructive as they possibly can be. The acidity is so marked that complete destruction or disintegration of the tooth must result if the condition is not changed. But in another group of cases, where the decay is more local, the environment is not so destructive and the acidity is not so pronounced or general.

You have all seen cases where the teeth on one side of the mouth were extensively involved in the carious process, while those on the opposite side were nearly or quite immune. Again, you have seen patients who presented extensive decay of the teeth of the lower jaw, while those of the upper were not involved. These occurrences lead us to the typical Yankee question,—"Why"?

My impression has been, and my investigations have confirmed my impressions, that the process of decay is dependent upon the lodgment of food in the sulci and interstices of the teeth, and bacteria acting upon this favorable culture-medium, supplying as it does heat and moisture together with an abundance of oxygen, develops fermentation. This being the exact opposite of the normal condition, it is but reasonable to expect deleterious results. Two conditions facilitate the development of tooth-decay. They are, first, immature teeth, and second, starchy and saccharine foods.

This, briefly stated, is my view of the causation of decay of teeth. Time does not permit me to review the many theories advanced on this interesting and important subject. Yet, it is highly proper that the active practitioner should participate in the elucidation of these every-day problems. Dr. Black has expressed a generally-accepted truth, namely, that experimental research conducted outside of the mouth will not yield results, in all instances, consistent with those obtained in the mouth. Dr. Williams's splendid work in this field is worthy of the greatest consideration.

In our efforts to prevent tooth-decay, we are denied an important aid vouchsafed the other tissues of the body, namely, the white blood-corpuscles. Everywhere in the inaccessible parts of the body they stand the foe of invading harmful bacteria. Yet why should we ask indulgent nature to do for us what we should do for ourselves,—*i.e.*, keep our teeth clean?

This leads me to the question of prophylaxis in dental practice. Preventive medicine is the watchword of honest, up-to-date medical men. It is not for us or for them to stop by the wayside and let disease overrun a community or a local part, while we sit idly by and reckon the loss it would occasion our finances if we should do our part as professional men and stop the inroads of the invading disease. To do less than our full duty would be to stamp us as tradesmen, and very dishonest ones at that.

The ideal dentistry, like that of medicine, is the time when fewer ills will mean a higher level of prosperity and greater ability to pay larger fees for less extensive service.

We must educate the public to the need of keeping the mouth clean.

You see, I demand more than a hasty brushing of the teeth,—perhaps once a day. The prevention of tooth-decay demands not only clean teeth, but clean interspaces between the teeth, and equally important,—a *clean tongue.* If you will supplement this plan with the addition of an alkaline antiseptic mouth-wash preparation, I feel that you will have done a great deal to solve this important problem.

Will the members of this organization, of the dental profession, lend the help in this matter commensurate with their ability as operators and leaders of dental thought and action?

SOME NEW POINTS IN THE ANATOMY OF THE FACE AND JAWS.

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the National Dental Association, August 4, 1899.)

THE paper read this morning by Dr. Brophy, of Chicago, demonstrating his operation for cleft palate in early childhood, has caused me to somewhat change my paper and lantern exhibit in order to show that Dr. Brophy's operations are justifiable from an anatomical standpoint, and that the results they produce are not "miracles." All things are plain to those who know; to those who do not know or do not understand the workings of nature, "miracles" may explain cures they cannot otherwise comprehend.

Dr. Brophy's operation consists of paring the edges of the cleft, then passing sutures through the jaws above the alveolar process, and forcing the edges of the cleft together. (See Dr. Brophy's paper for details.)

There have been some objections to Dr. Brophy's operation on account of narrowing the arch. This I think is a mistake. Of course after the operation has been performed, if the jaws be examined, the upper one will be much smaller and narrower than the lower jaw. If an infant of the same age with a normal mouth be examined, a like condition will be found. In fact, if the teeth and alveolar ridges of both jaws be excluded, the upper jaw is smaller and narrower throughout life. This will be demonstrated by the following slides:

Fig. 1 is a picture taken from a fetus of about seven months. The skull has been cut perpendicularly, showing a transverse section of both jaws, mouth, and nasal chambers. It is quite symmetrical, and it will be observed that the section has been cut in the region of the developing deciduous molar teeth of both jaws, and that the width of the upper jaw is much less than that of the lower.

Fig. 2 shows a similar section taken from an adult person, a symmetrical skull having a full set of teeth erupted into their normal position. If the teeth and alveolar process be excluded, it will be observed, as in the fetal skull, that the upper jaw is much smaller than the lower. If a line be drawn through the longitudinal center of the upper teeth it takes a somewhat outward direction as it passes down; while in the lower jaw a line drawn in a similar manner would pass slightly inward as it extends upward. This relative arrangement it is which allows the upper teeth to overlap the lower ones and form the proper occlusion.

Fig. 3 is taken from two skulls of about the same shape and size. They vary, however, in age, that on the left being from an adult of about twenty years old, and having a full set of occluding teeth. The direction of the upper and lower teeth can be observed. The right picture is from a person of, I should judge, about seventy-five years or more, where all the teeth have been lost and the alveolar process has been resorbed, showing the upper and lower jaws in their normal size and shape, minus the teeth and alveolar process.

FIG. 1.

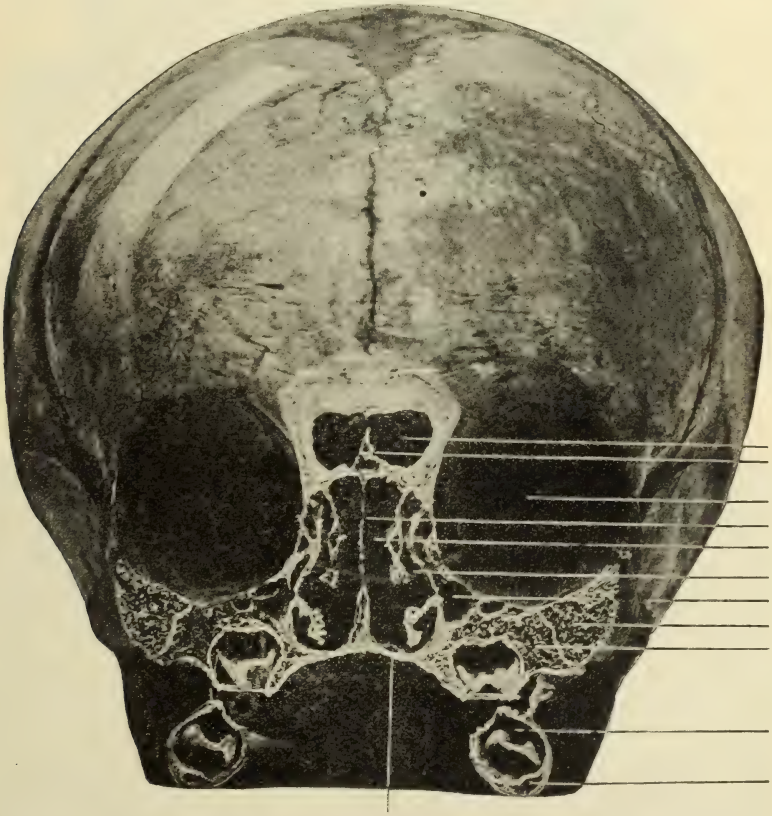
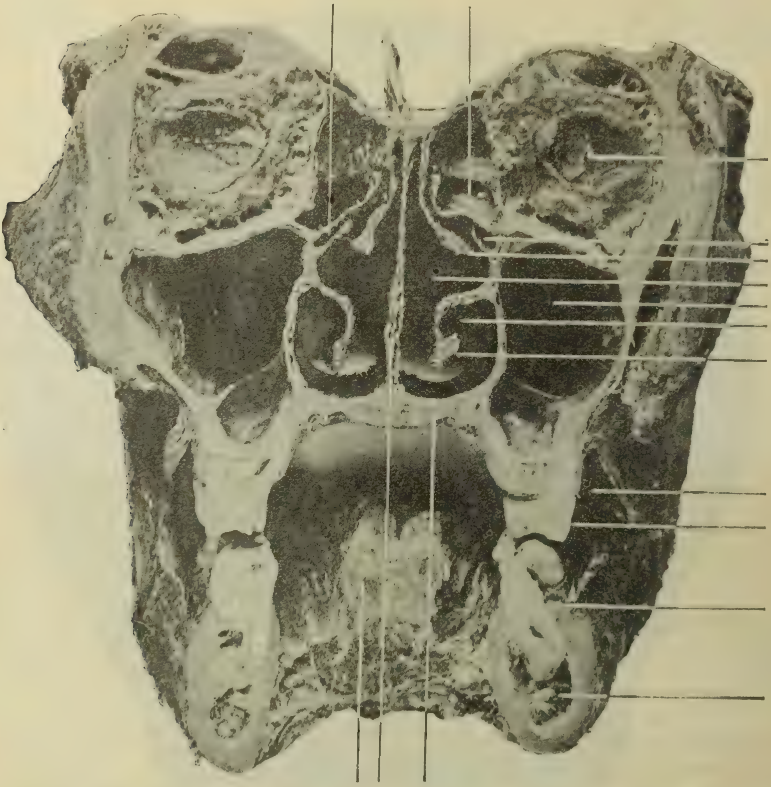


Fig. 4 is the side view of the same skulls. Those who have studied the development of the face know that the lower jaw is made up of two symmetrical processes, while the upper jaw has four processes, two from the sides and two from above. At about the fortieth day of intra-uterine life these processes should unite and form the upper jaw; they occasionally fail to unite, the extent of lack of union varying in degree. Various reasons have been given for this lack of union, perhaps the most prominent one being malnutrition during the time that the union should take place. It is commonly understood that the lower jaw is the first bone formed. Such being the case, does it not seem reasonable that occasionally the lower law might be more advanced in its development, and falling in between the forming processes of the upper jaw would prevent them from properly uniting? This would also cause harelip. It is generally accepted that the lower jaw is the matrix or form upon which the upper jaw is molded by contact, either through the alveolar process or the teeth. In what are termed mouth-breathing children or persons there is often found a narrow, contracted arch, caused by the non-occlusion of the teeth. If a person be a mouth-breather the teeth are kept asunder and the lower jaw does not force the upper teeth out to their normally arched arrangements. More than this, certain of the facial muscles drag upon the upper teeth and carry them inward.

FIG. 2.



If an examination be made of a young child with a complete cleft it will be noticed that the line of the upper alveolar ridge will be immediately over the alveolar ridge of the lower jaw, or it may be external to it; in the normal child or in the person of advanced age, the upper alveolar ridge is on a line within that of the lower jaw, as is well illustrated in the pictures shown.

In Dr. Brophy's operation he pares the edges of the cleft. These are usually somewhat hypertrophied in early childhood, so that in removing the edges he loses but little, if any, normal tissue. By passing the suture through the jaw he brings together the parts which were abnormally separated, but does not contract the jaw as has been claimed, which explains why the patients he exhibits do not have contracted arches. I would suggest to him, and to others who undertake this operation, to keep a sharp outlook for anything that would cause mouth-breathing, such as adenoid growths in the

FIG. 3.

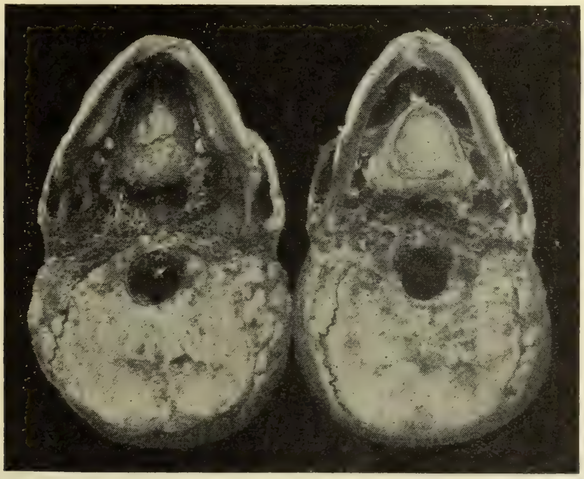
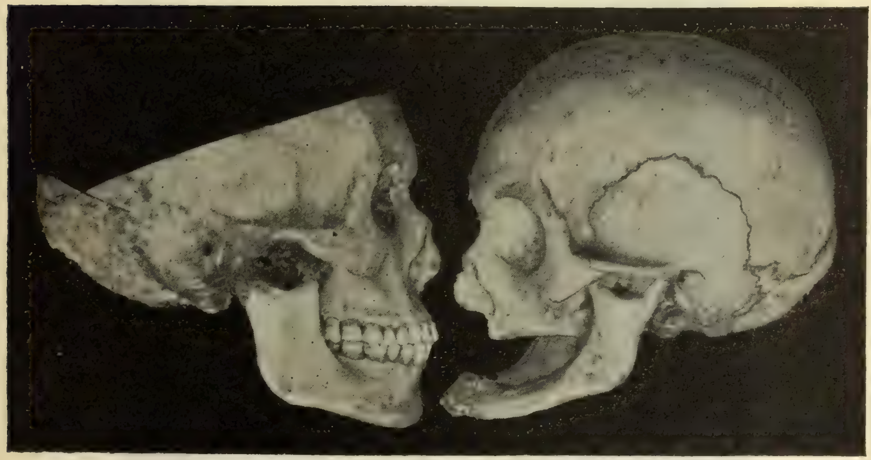


FIG. 4.



naso-pharynx, for if this be not avoided a contracted arch will probably result, as we often find even when there has been no operation for cleft palate.

FIG. 5.

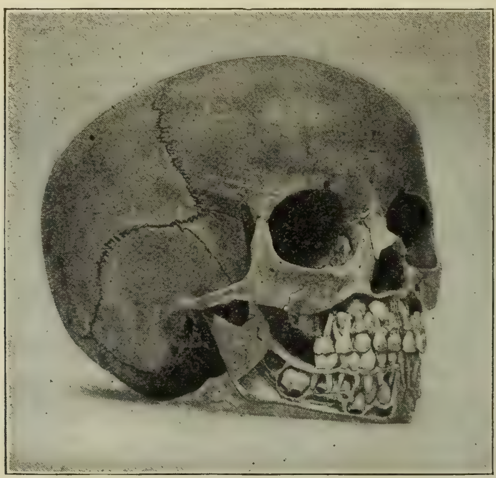
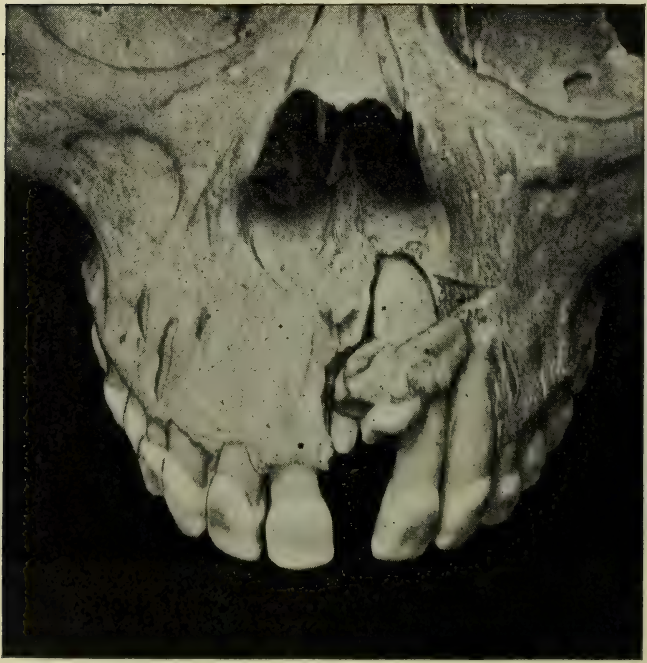


FIG. 6.



The finding of large numbers of impacted teeth, both in the cadaver and in the living subject, has created a desire to know something of the cause of such impaction. At the Asbury Park meeting of the American Dental Association for 1895, I gave illustrations of a number of impacted teeth. (See DENTAL COSMOS, January, 1896.) Since that time I have seen examples in the living person of nearly all the cases then described.

FIG. 7.

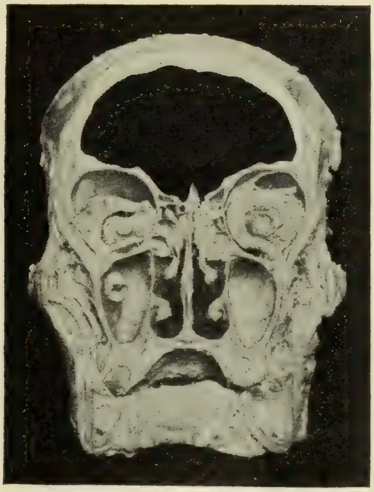
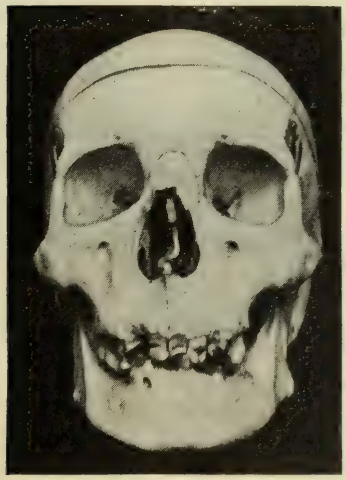


FIG. 8.



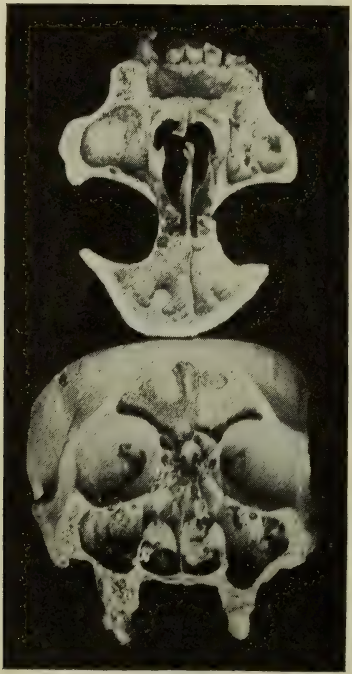
It is evident that there is an active process, varying in degree according to age, going on in the osseous surroundings of the teeth from the time of the development of the first tooth until the eruption of the first molar; even then it does not cease.

As the teeth are worn down they become more or less diseased and lost, and the alveolar process is resorbed, and in old age the jaws take the shape shown in Figs. 3 and 4.

If the active process going on in the jaws be interfered with, the normal eruption and arrangement of the teeth must be modified in proportion. The interference causing impaction can often be attributed to the many diseases of children, as scarlet fever and others which cause an inflammatory condition in and about the jaws.

In order to get a better idea of the arrangement and position of the deciduous teeth, and the organs developing into the permanent ones, Fig. 5 is introduced. It is taken from the skull of a child of about six years of age. The external walls of the alveolar process of the upper and lower jaws have been removed, together with some of the cancellated tissue, exposing the roots of the deciduous teeth and the crowns of the permanent ones. It will be noticed that at this age nearly all the space of the maxillary bone is occupied by the dental organs, there being but little room for the maxillary sinus. By interference with these organs, at this period of life, it will be seen how easily these teeth can be deflected or detained from assuming their normal position, interfering with the sinus or nasal chamber, and how, by these chambers being changed, associated cavities and adjoining structures will also be changed.

Fig. 9.



There are two opposite results associated with inflammations within the jaws. One is suppurative, causing the breaking down of tissue, the other is the building up and hardening of tissue, through which the cancellated tissue is transformed into hard and dense bone. (See illustrations given in the DENTAL COSMOS, January, 1896.) Through this hardening of the bone before the proper eruption of the teeth, they become incased within their capsules in the adjacent bone, under which circumstances it would be impossible for the eruptive force to carry them into proper position. They are often held in their place of development, or pushed in the direction of the least resistance, until resorption of the bone-tissue occurs, and then they usually make their appearance in an abnormal position.

FIG. 10.

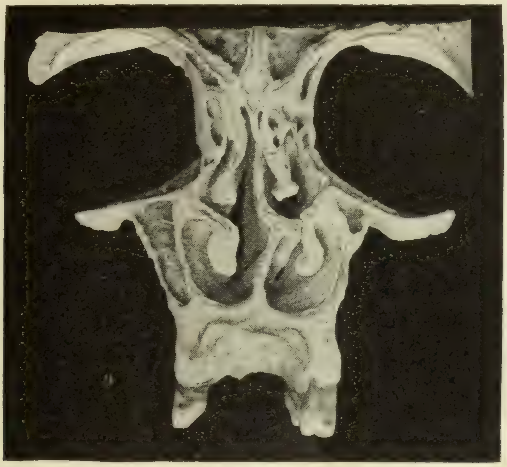
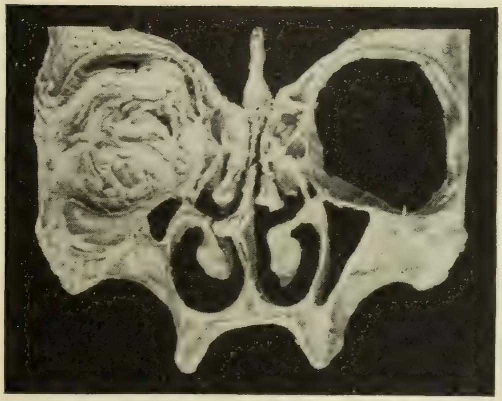


FIG. 11.



The development of a supernumerary tooth or teeth may also cause impaction of a normal tooth. There are two marked cases that have come under my observation. The first is in a skull belonging to Dr. Kirk's collection, where thirteen supernumerary small teeth had developed in front of the left upper central incisor, which was found upon dissection to be impacted between the floor of the nose and the roof of the mouth. (See report made by Dr. Kirk, DENTAL COSMOS, April, 1898.) The other was in the mouth of a patient of Dr. Huey's, where thirty-five small supernumerary teeth were found within the alveolar process, in the space which should have held the left central incisor. After removing the supernumerary teeth the permanent normal incisor could be seen

FIG. 12.

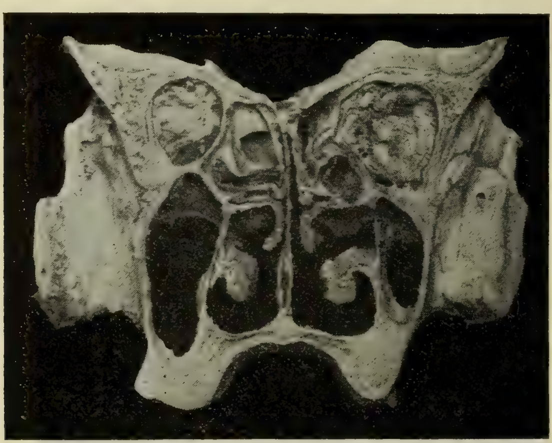
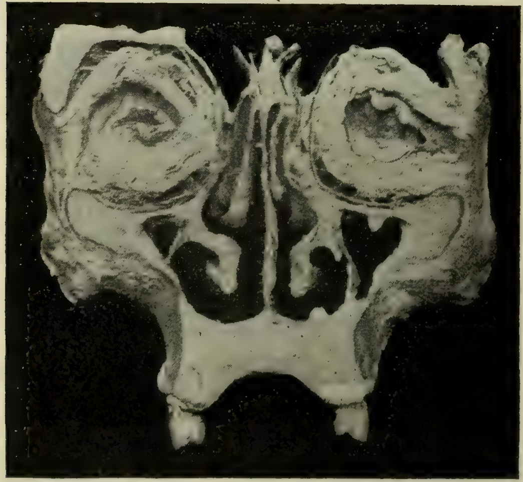


FIG. 13.

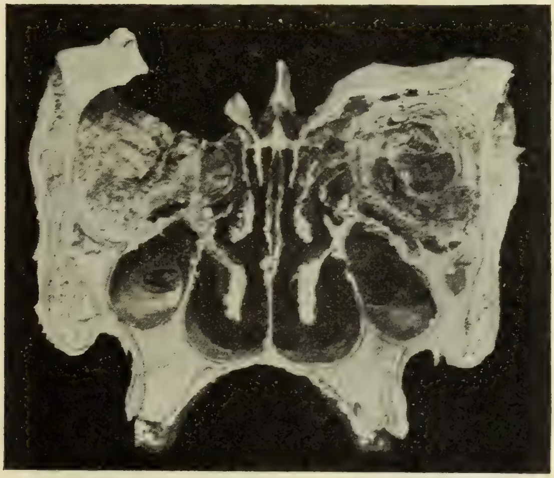


resting between the plates of bone forming the roof of the mouth and the floor of the nose.

Fig. 6 is taken from the skull in Dr. Kirk's collection. It affords a good illustration of the condition found in the mouth of Dr. Huey's patient. In Fig. 5 it will be noticed that the position of the developing upper second and third molars is very close to the under surface and posterior portion of the orbit. This was interestingly demonstrated by a patient referred to the Department of Dentistry of the University of Pennsylvania, who has an upper third molar impacted, the crown of which is in the upper posterior wall of the maxillary sinus.

Fig. 7 is from a made specimen which was constructed in order to secure a photograph which would give an idea of the position of the tooth in the patient's mouth. If this tooth has roots of normal length they will extend backward across the spheno-maxillary space, the points of the roots will be near the sphenoidal sinus, and the roots will be covered with a thin lamina of bone developed from the maxillæ. In June last, while Dr. Kyle, of Philadelphia, was speaking of this case before the Section of Laryngology and Otology of the American Medical Association, Dr. Stout, also of Philadelphia, thought it strange that a tooth should pass upward instead of downward. In my opinion the tooth referred to has never passed downward from its place of development; through some inflammatory process the tooth and its capsule had become adherent to the posterior wall of the maxillary bone, the "intrinsic force" being insufficient to force the tooth into proper position at the time it should have made its descent. It is somewhat analogous to an adherent testicle in the abdominal cavity or in the inguinal canal. There is no more reason to think that the tooth

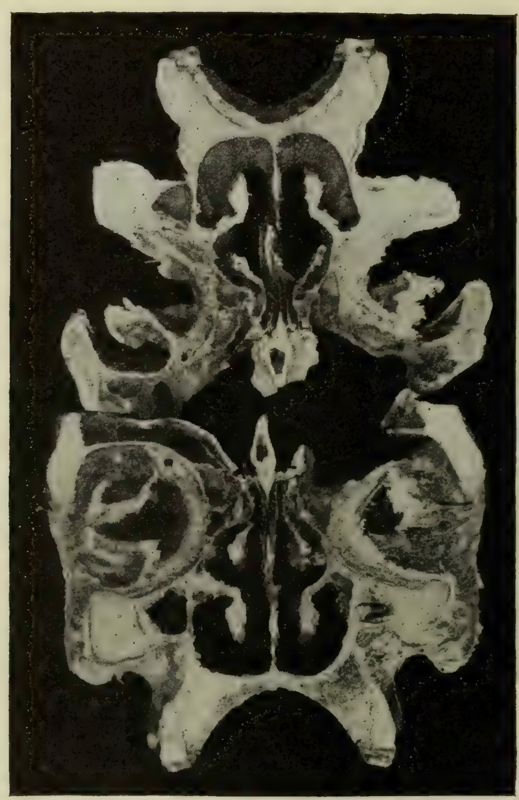
FIG. 14.



passed upward than to say a testicle had passed up from the scrotum into the canal or abdominal cavity.

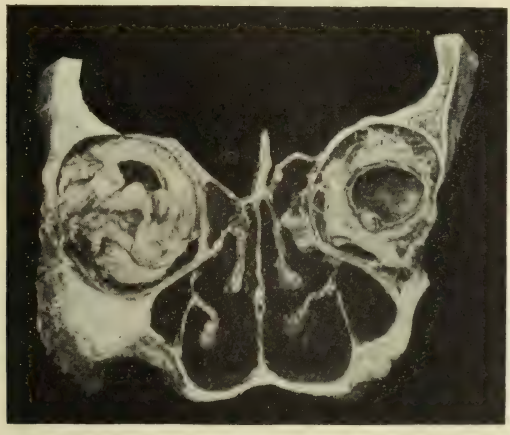
In former papers upon variations of the maxillary bones and their adjacent parts, an endeavor was made to show that there was quite a constant anatomical law; that when the mouth, palate, and dental arches are bilaterally symmetrical, with proper occluding teeth, the other structures of the face will exhibit a like condition; even more, the bilateral symmetry will be found to extend throughout the body. However, this law, as all others relating to anatomical science, is open to exceptions.

FIG. 15.



The great majority of persons do not have this bilateral symmetry within the mouth, consequently the internal structures of the face are changed and modified. The reason given for impacted teeth will afford a partial explanation of other deformities and variations in the region above the teeth. To avoid this deformity close attention should be given during the development, growth, and eruption of the permanent teeth, also the growth of the alveolar processes, and great care should be given to the deciduous teeth, the mouth in general, and the nasal chambers and the naso-pharynx, and to any constitutional disease that may influence the formation of these parts. Diseased teeth causing inflammation should have proper attention, as they can bring about constructive periostitis or a suppurative inflammation. If the former, the bone becomes dense and the permanent teeth are prevented from taking their proper position in the jaws, thus causing malocclusion of the teeth. Malocclusion will certainly modify the shape of the mouth, and this modification will have an important bearing on the shape of the maxillary sinuses and other internal structures of the face. A suppurative inflammation may bring about the softening of the surrounding tissue, which again will have its influence in modifying the character of the internal structures of the face. Under such conditions occlusion of the teeth brings pain, which causes the person to keep the jaws apart. This allows the intrinsic force acting upon the teeth to make them "elongate," and by not having proper pressure of occlusion upon them during their eruption the upper teeth are not carried to their normal position as when the parts are normal, thus causing a contracted arch, which again changes the character of the cavities of the internal face.

FIG. 16.



The naso-pharynx, next to the teeth, should have the closest attention, as the closure, partial or complete, of the posterior nares will cause "mouth-breathers," in whom the teeth are not occluded. Through this the teeth elongate, and are not pushed outwardly to overlap those of the lower jaw, thus giving a narrow, high arch and its concomitant defects.

The slides following will illustrate some of the various changes that have been brought about by the causes given for such modifications.

Fig. 8 is from the front view of a skull which has not a true symmetrical arch of the mouth, the greater portion of the teeth having been lost early in life.

It will be noticed that the canine fossa of the right side is lacking, the face being bulged out at that point. The teeth have not been in normal positions. The septum is deflected toward the right side. In a skull of this character the internal structures will usually be very much out of symmetry; quite different from the condition shown by Fig. 3. One might suppose that a large antrum would be found under this projection, but in this particular case it is not so.

FIG. 17.

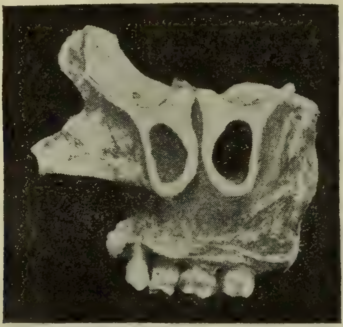


FIG. 18.

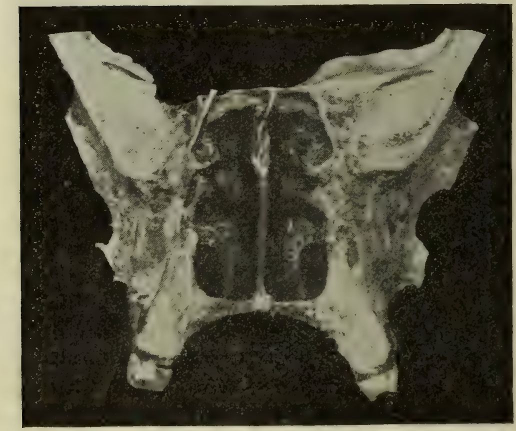


Fig. 9 presents a transverse section of the last skull shown. It will be seen that the right antrum is smaller than the left, the fullness of the region in the infraorbital foramen and the canine fossa being due to the thickness of the bone. The frontal sinus of this specimen extends downward between the orbits lower than usual.

Fig. 10 exhibits an entire lack of symmetry between the nasal fossa and the sinus of the right side, the inferior meatus on one side being closed anteriorly by the deflected nasal septum and "spur" passing over and against the inferior turbinate and carrying it toward the outer wall of the fossa.

In Fig. 11 it will be noticed that a line or instrument passing through the axes of the alveolar process of the right side would perforate the nostril instead of the front of the maxillary sinus.

Fig. 12 is taken from a different skull, and has almost a straight septum and bilateral symmetry as to the nasal chamber; the maxillary sinuses, however, vary throughout the depth of the skull. On the left side the antrum would not be reached by drilling through the alveolar process.

FIG. 19.

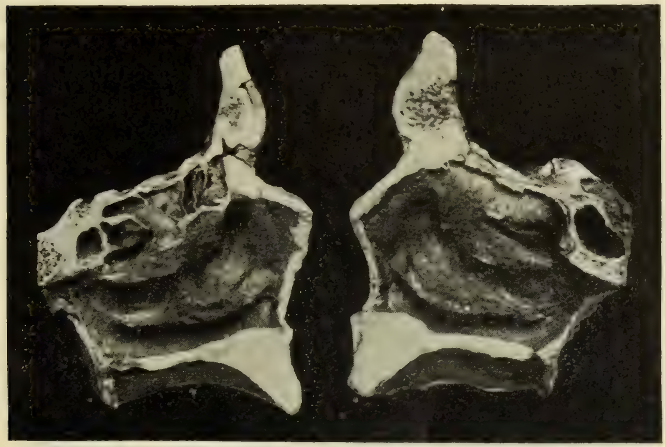


FIG. 20.

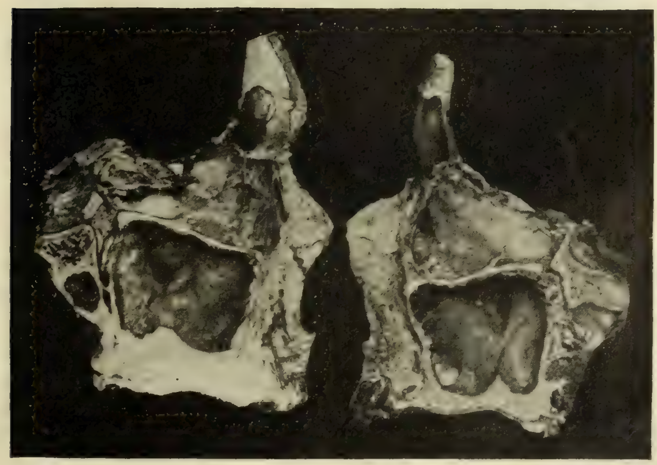


Fig. 13 is from a different skull, a transverse section made in the region of the first premolar. The septum is almost straight, the nasal chamber nearly symmetrical on both sides, but there is a great variation in the maxillary sinus. The outer wall of the nasal chamber of the right side is the outer position of the maxillary bone, the floor of the antrum being on a much higher plane. In the floor of the left nasal chamber there will be noticed an elevation which covers a tooth root, more than likely that of a supernumerary tooth.

It may have been noticed in Figs. 10 and 11 that the nasal walls of the right inferior meatus, and in Fig. 12 that the left meatus, passed outward under the maxillary sinus to the facial portion of the maxillary bone; the same condition will be observed in Fig. 13 in the distal portion of the zygomatic wall. We often read and hear of the surgeons opening into the maxillary sinus through the canine fossa; if such an operation were performed on the skull of the specimen from which these photographs were made, the instrument would pass into the nasal chamber instead of the sinus. I have known such occurrences to take place.

FIG. 21.

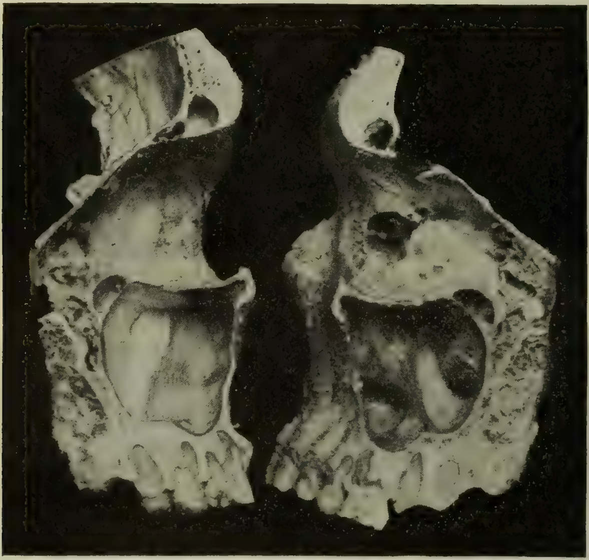


Fig. 14 is a transverse section made through a skull in the region of the second molar. The septum is straight, the nasal chamber and its appendages and the maxillary sinuses are small, and do not extend downward in the direction of the teeth and the alveolar process.

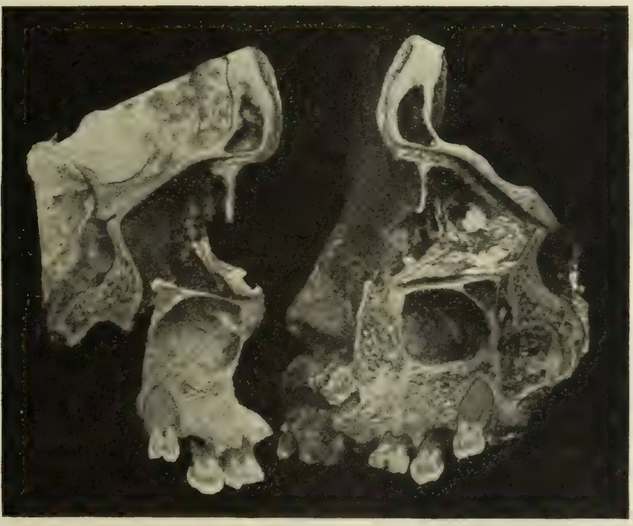
Fig. 15 is a section from the same skull as Fig. 14, cut more anteriorly, in the region of the bicuspids. Here we find the parts are almost symmetrical. The crista galli has been cut transversely, showing within the walls a cell of considerable size; its opening is into the frontal sinus.

Fig. 16 is made from the skull of an old person, in which the bones have been much resorbed; it is comparatively symmetrical, with the floor of the sinus much higher than usual and the nasal fossa passing outward to the external portion of the maxillary bone.

Occasionally in surgical practice abscesses are found opening on the face in the region of the malar bone. These are often looked upon as of superficial origin, but when carefully examined they are found to be associated with the maxillary sinus. Fig. 17 will partly explain why, occasionally, abscesses of the maxillary sinus open at this point; the section is made in the region of the maxillo-malar articulation through which the maxillary sinus passes far into the malar bone, extending backward into the zygomatic process.

As far as I am acquainted with the text-books used in American medical and dental colleges, they do not properly describe the external walls of the nasal chamber, nor do they describe fully the outlets or passage-ways from the various sinuses and air-cells. As to the meati, the books teach that there are three; this should be corrected. Zuckerkandl has stated that about sixty-two per cent. of the skulls examined have four meati; I have found fully that number in the skulls I have made sections of, and in many cases have found five. I do not know of five being mentioned by the writers. In one skull I have found six meati on each side.

FIG. 22.



The general teaching of books is that the fluids from the lachrymal glands flow into and through the first or inferior meatus; those from the frontal sinus, anterior ethmoidal cells, and maxillary sinus flow through the second or middle meatus, and those from the sphenoidal sinus through the third or superior meatus. There should be added to the fluids flowing through the middle meatus those from the middle ethmoidal cells. The most constant cell emptying its fluids into the third meatus is the one found in the orbital process of the palatal bone, while in the fourth meatus, "the supreme," there are the fluids from the sphenoidal cells and other posterior ethmoidal cells. Where there are five meati, the fluids of the posterior ethmoidal cells flow into the fifth.

FIG. 23.

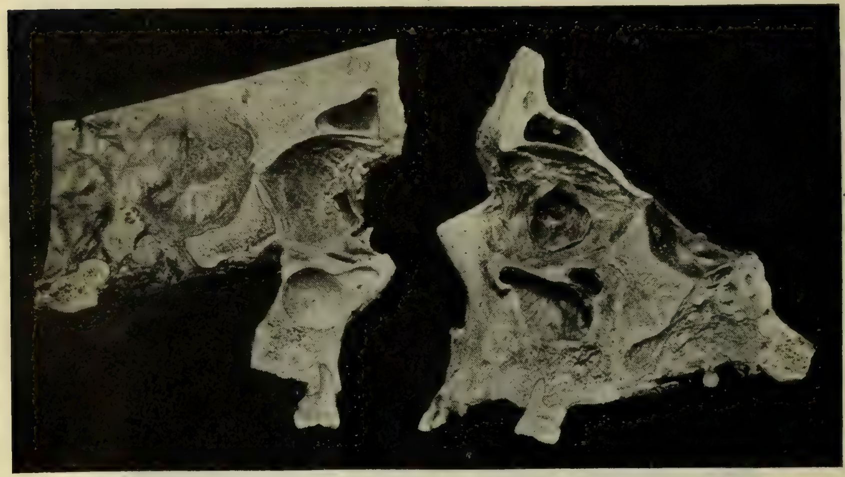


FIG. 24.

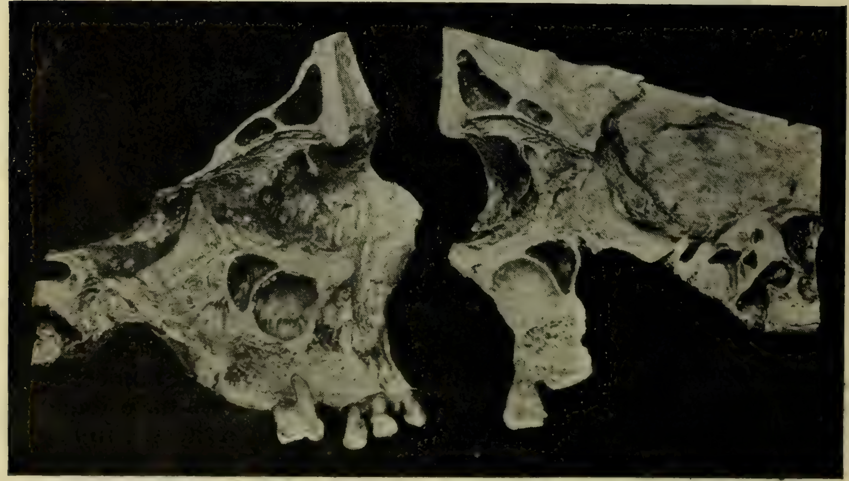


Fig. 18 gives a view of a section near the posterior nares looking forward; it will be observed that there are six meati. This is the only case I have noticed, in my section cutting, showing so many.

Fig. 19 gives a typical view of the lateral walls of the nasal chambers from the same skull. They are almost symmetrical. It will be noticed that the ethmoidal cells are exposed in the right picture. In both of these four meati are plainly seen, and in one there are five.

Before dismissing this illustration I wish to call attention to a pathological condition. It will be noticed that there is a deposit filling the space in the region of the frontal sinuses. It was spongy at the part shown. In one of the specimens I cut the outer wall away in order to more fully expose and examine it, and I found that the spongy condition became more and more solid as it extended outward until it was much harder than ordinary bone.

FIG. 25.

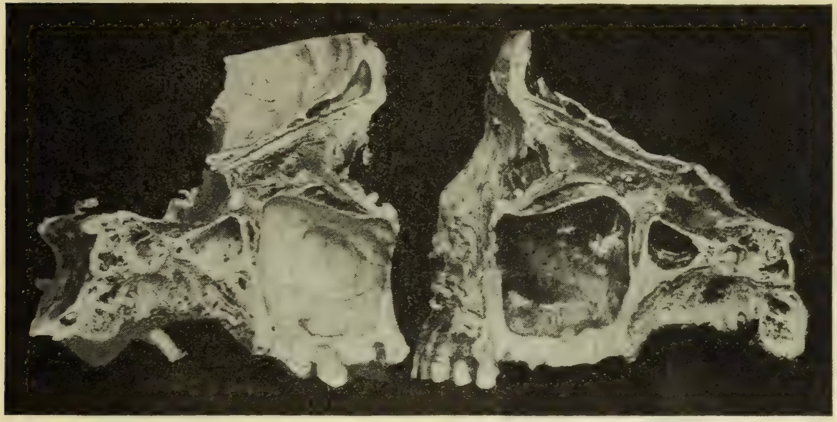


FIG. 26.

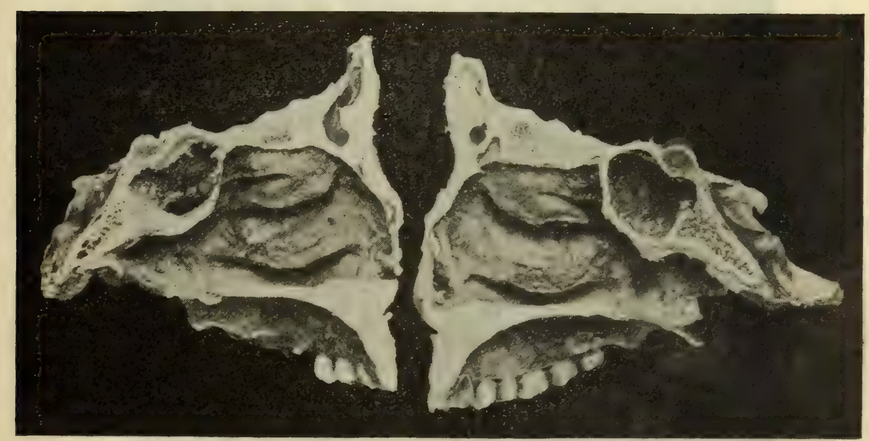


Fig. 20 shows the outer portion of this hardened structure projecting into the open space of the lateral portion of the frontal sinuses.

The shape and septa of the maxillary sinus vary so much that it is almost impossible to say what is a typical shape and what are typical septa. The pictures shown when speaking of the shape and extension of the nasal fossa will give an idea of the variation in a transverse direction. When they are cut from before backward

Fig. 27.

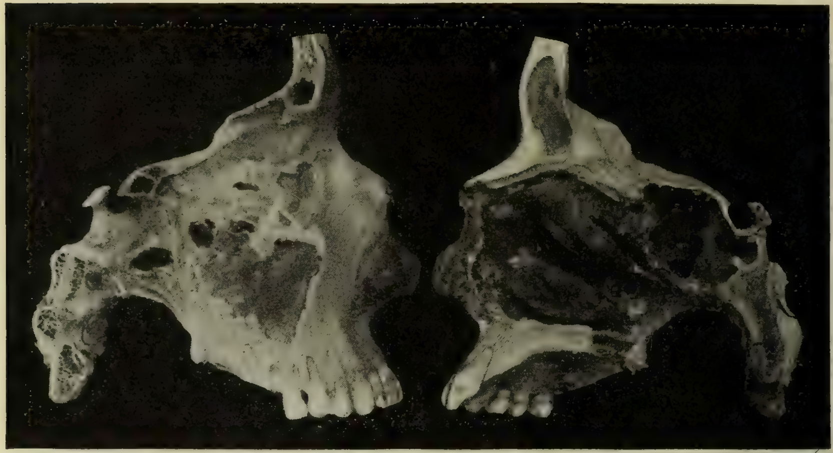
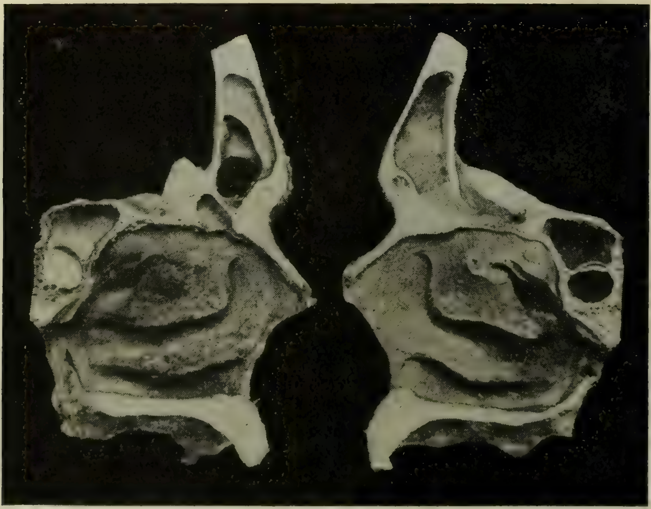


Fig. 28.



the shape and size will again be found to vary considerably. Partial bony or membranous septa are found passing in various directions across the sinus; but I have been unable to find complete septa of the maxillary sinus, though it is claimed by some investigators that they exist. These parts can be better explained as we pass from one picture to another.

The two maxillary sinuses in Fig. 20 are smaller than are usually found. It will be noticed that there are slight ridges in the floor of the sinuses suggesting the formation of septa. As I have said, complete bony septa of the maxillary sinuses are spoken of. I have been unable to find such conditions, although I have specimens which, when looked at in a casual way, could be classed as such.

FIG. 29.

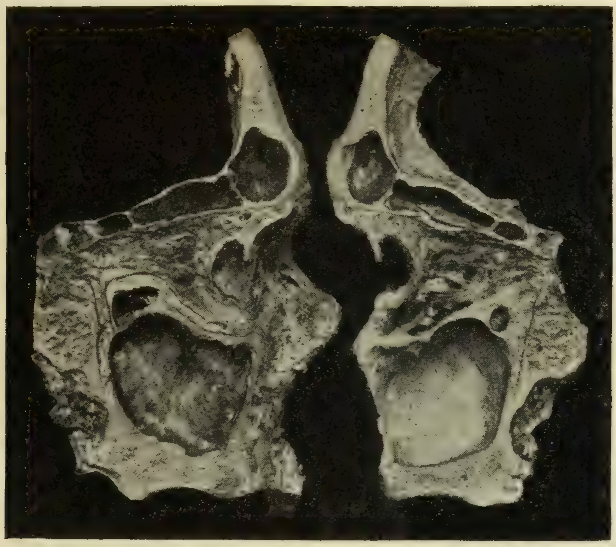


FIG. 30.

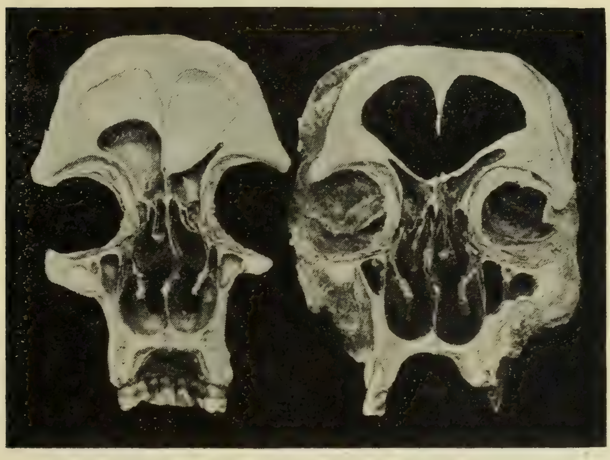


Fig. 21 shows what might be thought a bony division of the maxillary sinus; but close investigation reveals that the crescent-shaped cavities situated on the upper posterior corner of the sinus are the cell of the orbital process of the palate bone cut in two. A small probe passed through the openings in the right side would enter the superior meatus of the nose.

Fig. 22 is a section of a negro's skull, made through the molar teeth and the middle of the orbit. It shows a sinus at the upper posterior corner of the maxillary sinus. This opens into the superior meatus of the nose and belongs to the palate bones. It will be noticed that the antrum is of a very small size.

Fig. 31.

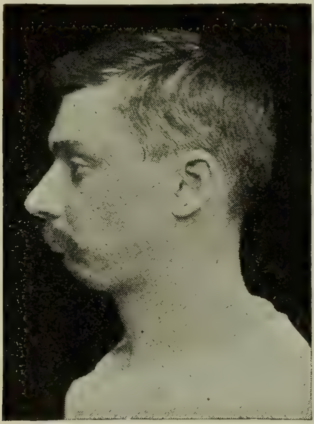


Fig. 32.

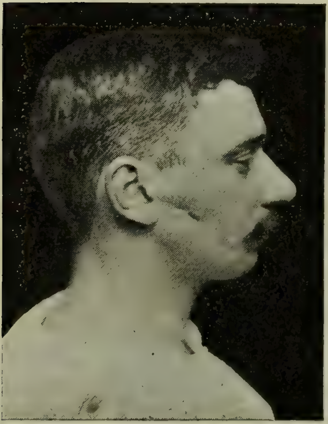


Fig. 23 is from the left side of another skull. The section is made in the same region as the last, showing a very small, peculiarly-shaped antrum and a crescent-shaped cell, which opens into the superior meatus.

Fig. 24 is from the left side of another skull, showing two sinuses.

The posterior one passes around the posterior border of the external surface of the anterior sinus. The bony septum of this specimen might very easily be considered as a division parting the antrum into two; but I would not thus classify it, as this posterior sinus opens into the superior meatus, as do the others.

It is a well-established fact that the maxillary sinus is developed by an invagination of the mucous membrane of the middle meatus into the body of the superior maxillary bone. If we should have two of these invaginations from the meatus I could easily accept as a fact that these cells were a divided maxillary sinus; but as the outlet of the posterior one is into the superior meatus, and as the cells of the orbital process of the palate bone open into the superior meatus, I claim that this is an enlarged palatal sinus or cell and not a divided maxillary sinus.

FIG. 33.

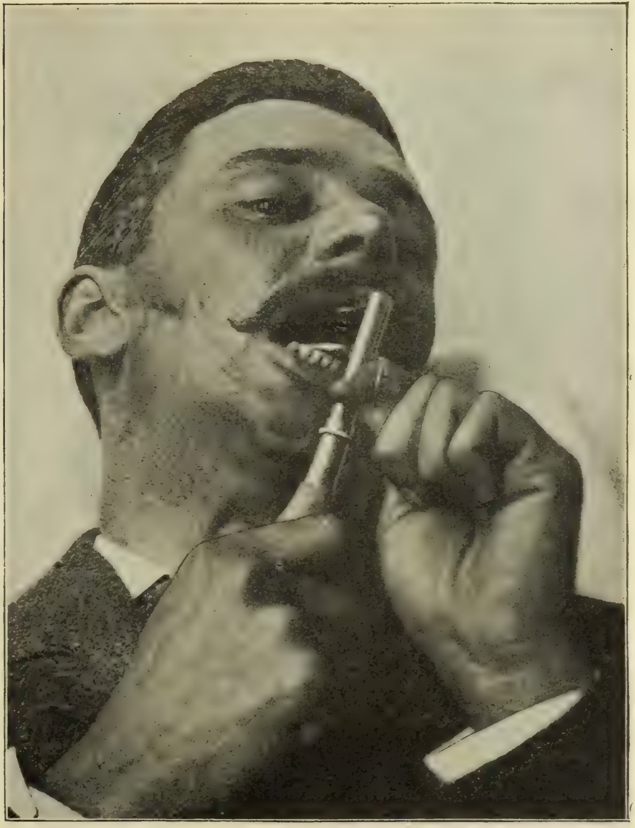


Fig. 25 is another section made through the molar teeth and the center of the orbit. Posterior to the maxillary sinus we find another sinus of a different character, which, to judge from superficial observation, might be thought to be related to the maxillary sinus as those belonging to the palate bone. Upon passing a probe into this it leads into the supreme or fourth meatus of the nose, showing that it is related or connected with the sphenoidal sinus. In fact, it is a very large sphenoidal sinus extending out laterally in a line almost to the outer part of the maxillary bone.

Fig. 26 gives a view of the external wall of the nasal fossa of the same skull, the sphenoidal sinus in the right-hand picture extending outward until it passes into the opening posterior to the maxillary sinus in the preceding slide. It will be observed that this large sphenoidal sinus extends well forward toward the frontal bone and backward toward the basilar process of the occipital bone.

Fig. 34.

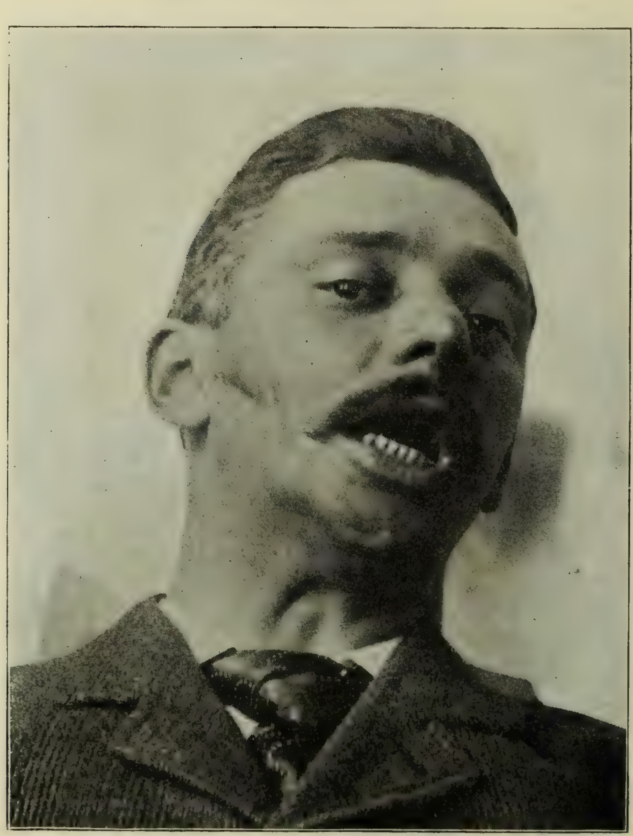


Fig. 27 is an outer and inner view of the same section. In the right-hand picture the cut is made through the bicuspid teeth, and a little to the inner side of the middle of the orbit, exposing the inner wall of the maxillary sinus, the cells of the palatal bone, and the sphenoidal sinus, over which is seen the sella turcica.

In the anterior clinoid process it will be noticed that there is a triangular opening which leads to the sphenoidal sinus; in the left-hand picture the external wall of the nose will be observed, and in the region of the body of the sphenoidal bone a very large sinus, at the bottom of which will be noticed a space under the sella turcica shown in the right-hand picture.

It is generally accepted that there are great variations in the frontal sinuses. The next three slides will demonstrate this to a marked degree.

Fig. 28 is made through the median line of the face, showing the external walls of the nasal chambers. Each picture shows four distinct meati. The object of this slide is to show the large frontal sinus of the left side. It passes over to the right of the median line, leaving little room for the right frontal sinus in its normal position. This is shown in the left-hand picture. Often where such things occur the opposite side will extend its air space in the other direction to make up for the loss by the invasion.

Fig. 35.

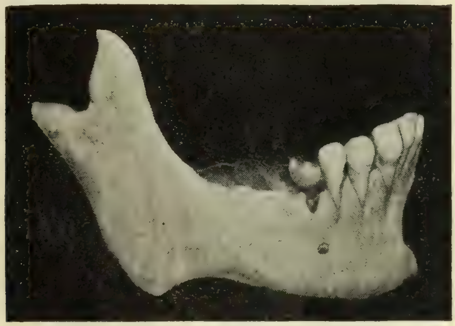


Fig. 36.

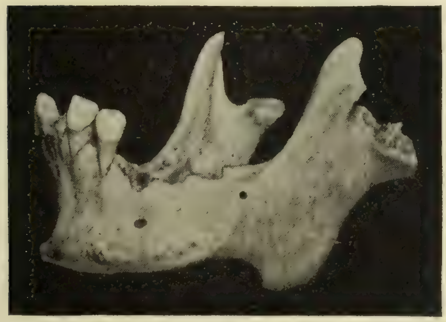


Fig. 29 is made from the right-hand picture of Fig. 28, cut through the center of the orbit, showing that the frontal sinus has extended backward over the orbit to the region of the optic foramen. It has extended also outward to near the external lateral process of the frontal bone.

Fig. 30 is made from a skull where the frontal sinus has extended upward under the region of the frontal eminence and downward to the middle of the orbit or almost on the level of the upper portion of the maxillary sinus.

In a paper read before the Dental Society of the State of New York in May, 1898, and published in the DENTAL COSMOS for November of that year, I spoke of a general law which influences bone modification by abnormal muscular or other forces,—*i.e.*, "The normal application of forces to developing bone results in the normal development of the form of the bone. The abnormal application of forces under the same circumstances results in the development of an abnormal form. Abnormal application of forces to bone in adult life will also change and modify the shape and character. The bone becoming changed, the whole body is modified according to the change in the bone-tissue." The modification of bone by abnormal muscular force is well illustrated in those persons suffering from false or true ankylosis of the temporo-maxillary

FIG. 37.

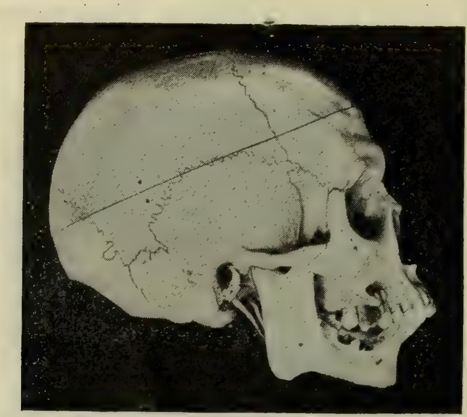
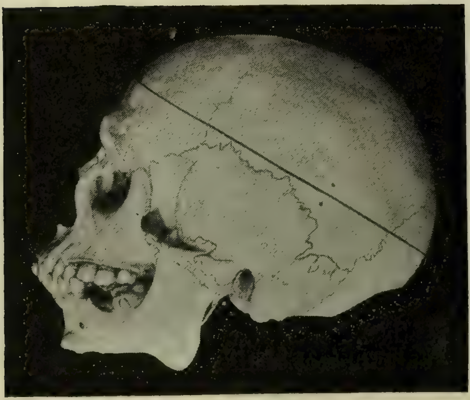


FIG. 38.



articulation. The illustrations are taken from a patient and from the bones of two skulls.

Fig. 31 is from the photograph of a patient. Judging from the general outline of the face, with its protruding lips and receding chin, one might be inclined to classify the person as a degenerate so often spoken of by some of our writers. By this picture, and others to follow, I wish to demonstrate that this is the typical face belonging to those having, or who have had, ankylosis of the jaw, be it a false or true one. This patient has suffered from a false ankylosis since about nine years of age.

Fig. 32 is taken from the right side of the same face, showing a scar extending from the angle of the mouth upward and backward to the region of the external auditory meatus. This scar was produced by a gunshot wound. In passing, the shot severed the masseter muscle as well as a portion of the buccinator. In the healing of the tissue false bands were formed, extending from the lower jaw to the malar bone and the zygomatic arch, thus preventing the mouth from being opened. The treatment consisted in cutting the false bands and using the mouth-gag with a screw arrangement. The operator was afterward assisted by the patient in forcing the jaws asunder, as shown in Fig. 33. The main object in using the appliance was to prevent these false ligaments from being reunited, and to stretch the temporal and masseter muscles of both sides. In a few weeks the patient could open the jaws without the appliance, as shown in Fig. 34.

FIG. 39.

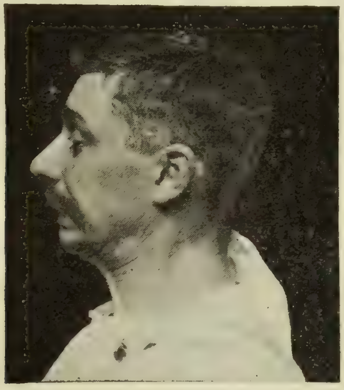


Fig. 35 gives a view of a typical ankylosed jaw, made from the opposite side of the ankylosis. It will be noticed that the condyloid process is shortened and that the articulated surfaces are changed. Instead of being rounded on the top it is more of a gothic shape. The angle of the jaw is much depressed at the point, and under the mental foramen the jaw is full. The mental process is almost lost by its recession; the coronoid process appears elongated. This is through the shortening of the condyloid process.

Fig. 36 is taken from the side of the same jaw, showing the condyloid process completely changed; it is flattened out with a number of serrations. The articulating surface of the glenoid fossa is also changed to correspond to the condyloid. The angle of the jaw is much more changed than on the opposite side, causing a deep depression in the region of the facial notch.

The lower jaw, under the mental process, is more full and roughened, and the mental process more receded than on the opposite side.

Fig. 40.

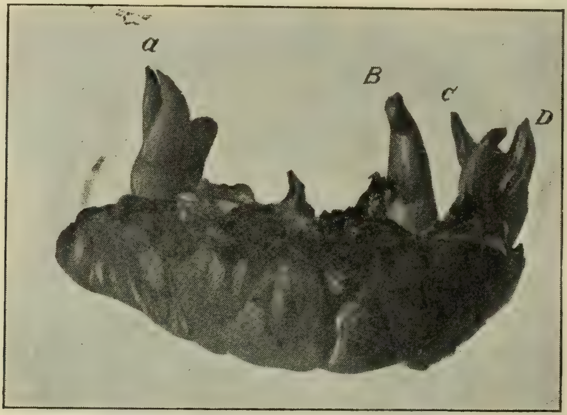


Fig. 41.

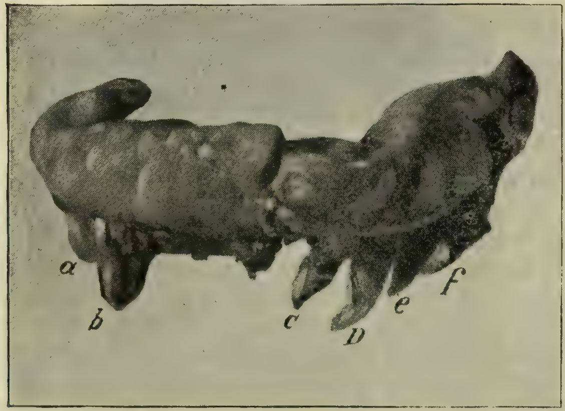


Fig. 37 is from a skull with a complete or true ankylosis, taken from the opposite side of the union. The close resemblance to Fig. 38 will be noticed in the complete ankylosis, the descending angle, the receding chin, etc., as shown in other pictures.

Finding this condition in all cases of prolonged ankylosis, it becomes evident that there is a cause for it. The muscles of mastication—*i.e.*, those which close the jaws—are inactive, while those which assist in opening them become more and more active in their work, with an endeavor to overcome the closure of the jaws. By this action the lower jaw, from the symphysis to the angle, becomes modified in proportion to the contraction of the depressing muscles of the jaw. Anteriorly there are the genio-hyo-glossus, the sterno-thyroid, the sterno-hyoid, the digastric, the omo-hyoid, and the platysma myoides.

FIG. 42.

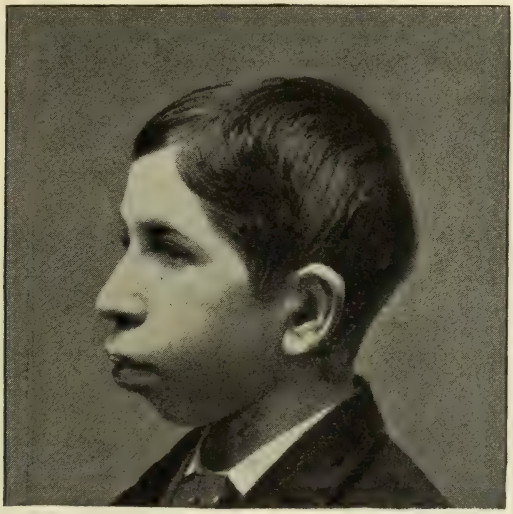


FIG. 43.

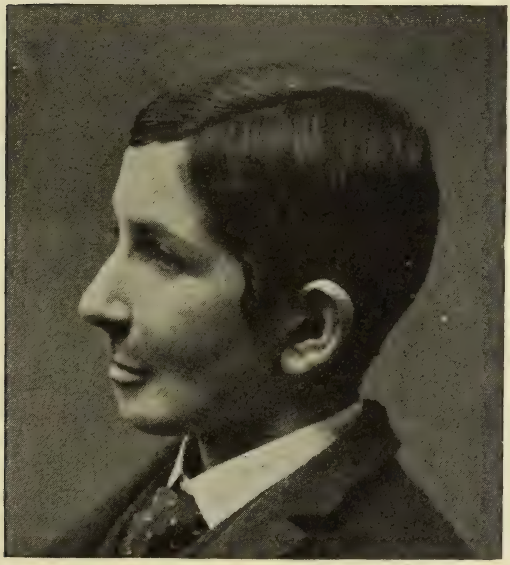


Fig. 39 is a picture taken from the same patient as Figs. 31 to 34. It is made while he endeavors to open the mouth, and will illustrate the various muscles under spasmodic action, showing the changes which their constant action will cause to take place in the form of the bone.

Having shown in the last few slides how muscular action changes the character of the face in modifying the lower jaw, I have thought it well to give illustrations of a case where the abnormal growth of bone brought about almost the same result, so far as appearance goes. In February, 1893, Dr. J. W. Hisey, of Cleveland, brought to the Hospital of Oral Surgery a boy of fifteen years. The boy was well developed, bright, intelligent, and well educated. He was afflicted with the most remarkable case of hypertrophy of the gums and alveolar process that has been recorded. The case was operated upon by the late Professor Garretson and myself, February 17 and March 11, 1893. (Full description of the operation will be found in the DENTAL COSMOS, June, 1893.)

FIG. 44.

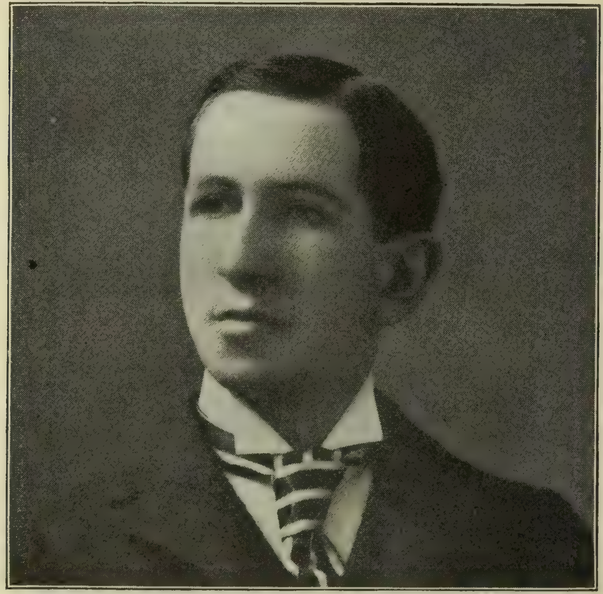


Fig. 42 is from a photograph taken before the operation. Here again, as in the first picture shown in the ankylosis series, this boy appears to have anything but an intelligent face. On February 18 Professor Garretson decided it was best to open the upper lip at the median line and carry the incision around to the alæ of the nose. By the use of the surgical engine and other surgical instruments the portion shown in Fig. 41 was removed from the upper jaw. It was thought best not to remove the abnormal tissue from the lower jaw at the same operation, so on March 11 the mass of tissue shown in Fig. 40 was removed from the lower jaw. This was accomplished without cutting the lip.

Fig. 43 is from a photograph taken shortly after the second operation, on April 28. Seven weeks after the operation the parts were thoroughly healed and his general health very good. He experienced less difficulty in articulating than he had previous to the operation, and the improvement in his speech and general appearance was very marked.

The operation was commented upon rather unfavorably by one who makes a specialty of oral surgery. This comment was one of the reasons for keeping track of the patient, and seeing how far Professor Garretson's judgment was correct. I occasionally receive letters from him, and in his last one he forwarded me his last photograph, so I could judge of his general appearance. I think you will agree with me that he does not look like a degenerate, and that the operation made a tremendous improvement in his appearance, and conclusively demonstrated that Professor Garretson was right. Fig. 44 is made from this photograph.

ARTICULATION.

BY DR. GEORGE B. SNOW, BUFFALO, N. Y.

(Read before the Union Meeting at Rochester, October 25, 1899.)

THE teeth, and the jaws into which they are inserted, may be considered as a mechanism intended for the comminution of food, which is thus put into condition to be more easily acted upon by the fluids of the stomach and digested.

The teeth are attached to the jaws by means of the alveoli, and are brought into contact as the mandible approaches the maxillæ; and substances suitable for food, when placed between them, are crushed by the operation of the masseter and temporal muscles, thus performing the function known as mastication.

To obtain a clear idea of the manner in which this function is performed, it will be necessary to consider the form of the mandible, the character of its joints, the different movements of which it is capable, and the forms and disposition of the teeth by means of which the function is more directly performed.

The mandible consists of a U-shaped body, a ramus rising obliquely on either side, terminating with the coronoid process in front, and the condyle at the rear; the latter articulating with the glenoid fossa of the temporal bone. Interposed between the condyle and the fossa is the interarticular cartilage; thin in its center, thick at its edges, more especially at the rear, with synovial sacs above and below. The lower sac allows the hinge-like movement of the mandible, while the upper one gives movement upon the eminentia articularis, and allows the cartilage and condyle to move directly forward. This movement is executed by the contraction of the external pterygoid muscle, which has its origin on the pterygoid plate of the sphenoid bone, and passes outward and backward to its insertion, partly in the neck of the condyle and partly in the edge of the interarticular cartilage. The cartilage, when applied to the condyle, has its upper surface nearly flat, so that the forward movement of the joint is in practically a straight line, diagonally forward and downward. As the prominence of the eminentia articularis varies in different individuals, and even to some extent at different sides of the same jaw, the amount of obliquity of the movement also varies.

The movements of the mandible are as follows: The direct, hinge-like movement, as when the mouth is opened. The movement of protrusion, when both of the external pterygoid muscles contract simultaneously, and the condyles, with the interarticular cartilages, are pulled forward upon the eminentia articularis. The lateral movement, when one of the condyles is brought forward, the other rotating in its socket, and the mandible is thrown to one side. Or by the alternate contraction of the external pterygoid muscles, this movement may be made bilateral; in which case each condyle moves forward alternately, and is then retracted to its normal position, the mandible passing to and fro past the median line. This movement, when compounded with the first, constitutes the movement of mastication, the teeth being brought together with a lateral, or grinding, movement.

It is interesting to note that all species of animals do not possess the lateral movement of the mandible. In the carnivora, the dog or cat for example, the condyles of the mandible are almost directly in line with the grinding-surfaces of the teeth, and the movement is ginglymoid, or hinge-like, only. The herbivora, on the contrary, have well-developed rami, and the condyles are set well above the teeth, and there is a very free lateral movement to the mandible.

The teeth are arranged in either jaw in the form of an arch; the incisors, cuspids, and first bicuspids presenting a circular outline, the second bicuspid and molars running backward in diverging and nearly straight lines. The lower incisors are arranged on a smaller circle than the upper ones, and when the teeth are in contact they usually pass upward for a short distance behind the upper incisors, and are thus enabled to exert a shearing action in biting off morsels of food. This peculiarity is known as the "overbite," and is variable in extent. The bicuspid, or two-pointed teeth, come next to the cuspids, their cusps being quite long and sharp; and after them the molars, or multicuspids, the length of the cusps of these teeth diminishing gradually from front to rear.

These peculiarities are to be noted when the teeth are brought together. The lower incisors being narrower than the upper, the lower bicuspids are about half a tooth in advance of the upper ones; the second lower bicuspid being central to the space between the upper bicuspids. The teeth of one jaw interlock with those of the other, their cusps being received into the sulci of the opposing teeth, or the interdental spaces. The articulating surfaces of the teeth form a curved line; convex in the upper jaw, concave in the lower: the curve sometimes rising quite rapidly at the rear. There appear to be two reasons for this arrangement. If the teeth were set in a horizontal plane the second and third molars, approaching each other at an angle of nearly 45°, would have too much of a sliding movement. They are accordingly set with their articulating faces in a curve, which enables them to meet more squarely; the rise of the curve at the rear bringing their faces more nearly to a right angle with the line of movement. Then, again, when the mandible is thrown to one side and the teeth are brought into contact, the cusps do not rest in the sulci, and the jaws are slightly separated. The condyle on the side from which the movement is made has moved forward upon the eminentia articularis, and is consequently somewhat depressed. The bicuspids on this side are thrown out of bearing, but the inclination of the faces of the molars enables them to touch; so that the bearing of the teeth will be on the bicuspids on the side toward which the mandible is thrown, and the molars on the side from which movement is made, which side moves forward as well as sidewise. The food is usually placed between the teeth on the side toward which the mandible moves, and is crushed by the returning sweep of the mandible. This arrangement of the teeth does not obtain in every case, but with the majority of well-arranged, well-developed natural dentures some of the teeth on both sides of the mouth will come into contact during the lateral swing of the mandible.

It is laid down as a rule that when the teeth have long cusps the incisors will have the more overbite, and the compensating curve, as it has been termed, will be greater. When the cusps are less prominent the overbite is less, the compensating curve is flatter, and the lateral movement of the mandible more free, as the eminentia articularis will in this case be less prominent.

The point of moment now is, what deductions can be made from this?

What deductions can be made from the case, as above presented, relative to the articulation and arrangement of artificial dentures?

In the first place, we must remember that the conditions existing when the natural teeth are in place are widely different from those which pertain to their artificial substitutes. In the one case the teeth are set in the alveoli, forming practically part of the jaws, while the substitutes have but slight attachment, the upper plates by adhesion, the lower, generally, by gravity alone; the latter being notoriously unstable. If we attempt the use of teeth with long cusps and long overbite we will have conditions favoring the exertion of lateral forces upon the plates, and they will be dislodged. The cusps of artificial teeth, therefore, should not be so long as those of the natural ones. The proportioning of the opposing sets is a matter of considerable importance. The upper and lower teeth should be of such width, relatively, that the bicuspids will come into their proper places and interlock, the same as in the typical natural organs. If they do not do this, and the cusps touch upon inclined surfaces, there will be a tendency to slide the plates upon the gums, and they will be easily dislodged by such treatment. The teeth must rest upon their opponents so that the plates will be pressed directly home against the gums without developing any tendency to slide.

But how about their contact when the mandible moves sidewise in mastication? If the teeth are so arranged that they only make contact on one side at such a time, there will obviously be a tendency to tip and dislodge the plates. They must be arranged to copy nature, so that some of the teeth may be in contact on both sides of the mouth during all the masticatory movements; so that when the incisors meet edge to edge the molars will touch and prevent the dislodgment of the plates at the rear. When the side movement is made, and the bicuspids of one side touch, the molars of the other side should also touch. The plates, being held up at two or more points, cannot fall.

In setting up the teeth it is usual to first arrange the upper ten teeth in front, they being the most conspicuous; and there is the opportunity for the exercise of considerable taste in adapting them to their surroundings. If the incisors and cuspids are all set up alike, like the pickets in a fence, the effect will not be pleasing. The fact is that in sets of natural teeth there is an irregularity about their regularity. Each tooth has its peculiar way of standing in the set, and this gives the character and pleasing effect. There is a variation, of course, in different sets, but there are a few general rules which, if observed, will enable the dentist to get rid of the artificial appearance so often seen in his work. For instance, the central incisors usually stand with their cutting-edges slightly projecting, the bodies of the teeth being parallel. The lateral incisors have a little more inclination, and converge from above downward, the tips of their roots being farther apart than their cutting-edges and a little farther back than the tips of the roots of the central incisors. This peculiarity is the cause of a flattening of the alveolar plates, which has been given the name of the incisive fossa by anatomists. The cuspids are set more nearly perpendicular than the incisors, the roots being thrown out so that they form a prominence which is known as the canine eminence. To get the most pleasing effect these points must be remembered, and artificial teeth must be set up accordingly; the central incisors with their cutting-edges rather prominent, the laterals with more inclination from front to rear, the bases diverging slightly, and the cuspids nearly perpendicular and full and prominent at the base.

The bicuspids are next set up, their necks being kept well in, allowing the cuspids by their prominence to shield them from view. Attention must also be paid to the positions of the teeth as regards the alveolar ridge, and they should be set as nearly directly over it as the case will admit of; so that the bearing may be directly on the ridge and not behind it. The lower teeth next receive attention, and, instead of beginning with the central incisors, as before, the second bicuspids are first set up. These have their place, the points of their cusps being directly under the interdental spaces of the upper bicuspids. This insures the proper interlocking of the two sets, and is the important point. The cuspids and incisors are next arranged, the cuspids having considerable prominence at the necks; the incisors, unlike the upper ones, being set up picket-fence fashion. After this come the second lower bicuspids and the molars. These are easily placed so they will come into proper apposition when they are brought together in the articulator, the latter being supposed to have only the open-and-shut, hinge-like motion; but it will be difficult to tell what the effect will be in the mouth, with the various movements of the mandible. Before the teeth can be articulated with any certainty of keeping contact, sufficient to prevent dislodgment of the plates under all ordinary circumstances, two conditions must be obtained. We must be able to imitate with a fair degree of accuracy, with the articulator, the movements of the mandible. We must have the models so set in the articulator that they are in the same relations to its joints that the alveolar ridges are to the temporo-maxillary articulations. Though this latter condition is not usually complied with, a moment's reflection will show its importance. The movements of the mandible are made from the two condyles as centers, and each point in the articulating surfaces of the teeth moves in its own direction, according to its location. If the models are wrongly placed in the articulator, the movement of any particular point will not be the same as it would be in the mouth.

As an instance to prove this assertion, we may consider what is usually termed "opening the bite." The usual operations incident to the construction of the plate have been gone through with up to the arrangement of the teeth, and when they are tried in the mouth it is found that they will be better if they are brought down a trifle and the jaws separated a corresponding amount. The adjusting screw of the articulator is raised to separate the models as much as may be necessary, and the teeth rearranged; but when they are tried in the mouth the articulation is found to be wrong. This state of affairs has been experienced so often that it is a common saying that if the bite is changed in the articulator the teeth will not articulate properly when placed in the mouth. The reason for this is that the jaws of articulators are usually too long, and the models are consequently set too far from the centers. Then, the height of the center of motion above the articulating plane, if it may be so called, is seldom thought of, and is disregarded when the models are set. When the models are set too far from the center, and the bite is opened, the teeth, when placed in the mouth, will touch at the second molars only, and considerable grinding must be done before they can be used at all.

The late Dr. Bonwill did good service to the profession in calling attention to the defects in the usual methods of procedure in articulating teeth, but his presentation of the case was handicapped by the incorporation with many truths, undoubtedly new and useful, of some theories which did not, to say the least, render the matter more easily understood. The consequence was that his ideas and methods were but slowly received and comprehended; and, although some thirty years have elapsed since he first called attention to the subject, there are many in practice who are either ignorant of or who disregard his teachings. While there are some things in his writings which are irrelevant, and may be neglected, there are truths in them of the greatest value; and no one engaged in the practice of prosthetic dentistry will fail to profit by studying them closely.

TRISMUS AS THE RESULT OF ULCERATED TEETH, AND THE USE OF WEDGES.

BY PAUL VOIGT, D.D.S., PHILADELPHIA, PA.

TRISMUS as the result of ulcerated teeth occurs very frequently, and the patient, becoming alarmed at the disease because of the great distension which takes place around the jaw, accompanied by fever, pain, and debility, calls in a physician instead of a dentist to treat the case.

When a doctor of medicine is called to a case of this kind, in eight cases out of ten he orders a hot poultice to be applied to the cheek, and in twenty-four hours the patient, instead of being on the road to recovery, presents a pitiful appearance; eye almost closed, every muscle on the affected side of the face drawn out of place, and all the tissues distended as the result of engorgement of all the blood-vessels around the diseased part. The case goes on from one to several weeks, when a free incision is made with the knife on the outside for the evacuation of pus, an unsightly scar following the operation; and then the patient is sent to a dentist for extraction of the diseased member.

All this pain, debility, and disfigurement could have been avoided had the case been turned over to a reputable dentist in its first stages, or a dental surgeon called in consultation.

When we decide that it is necessary for the patient to have an ulcerated tooth extracted, it should be done at once, even though the face is considerably swollen; an ice-bag or ice-cold water should be applied externally until the swelling is reduced, and with the use of any antiseptic mouth-wash a rapid recovery will usually follow; but where the disease has made considerable progress, and trismus has set in, a slightly different treatment is required.

I am indebted for the following cases to Drs. C. D. S. Früh and John F. Roderer, of Philadelphia:

Miss C. Ulcerated lower third molar. The ulceration had been going on for a week; the patient had eaten nothing for several days, and slept very little; the mouth was nearly closed; breath fetid; had been unable to use a mouth-wash. I sharpened several pieces of wood into wedges, placed them between the teeth, and tapped them from time to time with a small mallet. After about half an hour the mouth had opened so that I was able to slip in a lance and cut freely around the abscess. The patient not allowing me to work further at this visit, I ordered a mouth-wash, an application of ice-bags, and made an appointment for the following day. The muscles had relaxed considerably when I saw my patient again, and I was able to wedge the mouth open to such an extent that I could extract the tooth. Continued the use of cold applications and mouth-wash, and recovery was a matter of a very few days.

Miss H. This case had been treated by a physician for three weeks, when, during his absence, one of the gentlemen before mentioned was sent for, and I was called in consultation. Trismus had set in, the teeth being closed within a quarter of an inch; and so much pus had formed that the last physician had used an aspirator to give some relief the day before. The cause of the trouble was a broken-down lower third molar, which had erupted outside the arch. I advised immediate extraction of the tooth. In this case I used wedges which I shaped out of cork, pressing them between the teeth with my fingers, and changing from smaller to larger ones, until in an hour I had the mouth opened so that I could use my forceps fairly well. I found, however, that it was necessary to extract the second before I could extract the third molar. An ice-bag was ordered to be applied externally, mouth-washes used, and a rapid recovery followed.

When the physician who had been treating the last case returned he was dumfounded to find that I had been able to extract the teeth; he had during his treatment made several attempts to reduce the distension by lancing the gums, and it was his intention to freely open the parts on the jaw the following day; so the patient, who was a young lady, was saved by the timely extraction through the process of wedging from a very unsightly scar.

CORRESPONDENCE.

REPORT OF THE COMMITTEE ON LAW, N. A. D. F., IN THE CASE OF DR. P. T. DIAMOND VS. WISCONSIN BOARD OF DENTAL EXAMINERS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—It is well known to the members of the dental profession, especially those interested in dental education, that in April, 1899, the Wisconsin State Board of Dental Examiners refused to register diplomas from the Chicago dental colleges and other schools as the law provides. The provision of the law is that the board shall at all times issue a license to any regular graduate of any reputable, legally incorporated dental college, without examination, upon the payment of the registration fee. After making inquiry of the secretary of the board as to the reason why the diploma of his client was not registered, Attorney Quarles, who had been retained in the case, received the following reply:

"MILWAUKEE, April 15, 1899.

"HON. J. V. QUARLES, Milwaukee, Wis.

"*Dear Sir,*—I am authorized to say from instructions received from a member of the Committee on Colleges of the National Association of Dental Examiners that if the college you represent accepts all the rules as laid down by the National Association of Dental Examiners, in regular form through that body, that this board will upon the receipt of such knowledge issue licenses to regular graduates of said college.

(Signed) "W. H. CARSON, *Secretary.*"

After receiving the above letter, Dr. P. T. Diamond, a graduate of the Chicago College of Dental Surgery, brought mandamus proceedings to compel the board to accept his diploma. The board moved to quash the proceedings, which motion was denied by the court, in a vigorous decision handed down by Judge Sutherland, of the Superior Court of Milwaukee County, Wisconsin. Summing up the case, in regard to the standing of the college, the judge makes use of the following language:

"The relation in this case shows that among intelligent men, whether members of the dental profession or not, the Chicago College of Dental Surgery must be regarded as a reputable institution. . . . Therefore, without difficulty the court reaches the conclusion that the motion to quash the mandamus proceedings must be denied."

The action of the board was based on the ground that those schools refused to subscribe to a rule passed by the National Association of Dental Examiners regarding the preliminary educational qualification of students, the colleges giving as a reason their unwillingness to accept the interference of the boards in a matter which was outside of their proper function.

The National Association of Dental Examiners, of which the Wisconsin Board was a member, at their meeting at Niagara Falls in August, 1899, rescinded the rule which was the cause of the controversy, and passed a resolution adopting, in substance, the rule governing preliminary educational qualifications of students which was adopted in 1898 by the National Association of Dental Faculties, and it was hoped that henceforth the two national bodies would work in concert and harmony. In adopting this resolution the National Association of Dental Examiners recommended to the various state boards that all the schools belonging to the National Association of Dental Faculties be placed on the recognized list, and that the graduates of those schools be licensed, and that all litigation cease. In all states where difficulties had arisen regarding the registration of diplomas of graduates of schools belonging to the National Association of Dental Faculties, the trouble was at once terminated and licenses issued, except in the state of Wisconsin. The representative from the Wisconsin Board pledged himself at Niagara Falls to return home and do all in his power to terminate the litigation. The week following the National Association meeting, the Wisconsin Board, with their attorney, met by appointment the representatives of the Chicago College of Dental Surgery and the plaintiff in the case against the board with his attorney, and after a conference the representatives of the board informed the representatives of the college that the members of the board had voted *unanimously* to continue the litigation.

On August 13, 1899, the following letter was written by Senator J. V. Quarles, attorney for the complainant, to Dr. T. W. Brophy, dean of the Chicago College of Dental Surgery:

"QUARLES, SPENCE & QUARLES,
"Attorneys and Counsellors,
"The Sentinel Bldg.

"MILWAUKEE, WIS., August 13, 1899.

"DR. T. W. BROPHY,
"126 State st., Chicago, Ill.

"*Dear Doctor,*—As you are aware, a meeting of the State Board of Dental Examiners took place yesterday in this city for the ostensible purpose of carrying out the recommendation of the National Board so explicitly made at its meeting at Niagara Falls. Nothing could be more plain and explicit than the recommendations of such National Association, which ought to be looked upon as a command by members thereof.

"I have to report, however, that our state board have assumed to be wiser than the national organization, and have positively declined to follow or respect the mandate of the central body. The state board refuses to recognize the diplomas of your college and all others similarly situated, and leaves no course open but to continue the litigation. We shall, therefore, unless ordered to the contrary, embrace the first opportunity to crowd the case to a final hearing and allow the National Board to deal with its recalcitrant members.

"Very respectfully yours,

(Signed) "QUARLES, SPENCE & QUARLES."

Preparations were then made for a vigorous prosecution of the case. The Law Committee of the National Association of Dental Faculties, which was created at the Niagara Falls meeting in August, 1899, for the purpose of taking charge of this litigation, as well as any other litigation involving the association or any college holding membership therein, held a meeting in Chicago, October 14, 1899, and after Drs. Barrett and Morgan, of the committee, held a conference with the members of the Wisconsin State Board, the latter agreed to license graduates of the Chicago colleges and all schools belonging to the National Association of Dental Faculties. November 6 the agreement was consummated. November 7 the following letter was received by the dean of the Chicago College of Dental Surgery:

"QUARLES, SPENCE & QUARLES,
"Attorneys and Counsellors,
"The Sentinel Bldg.

"MILWAUKEE, November 7, 1899.

"DR. T. W. BROPHY, Chicago, Ill.

"*Dear Sir,*—After great tribulation, regarding matters of detail, I am glad to report to you that the board has finally decided to conform with the provisions of the dental law of Wisconsin, abide by the ruling of the National Association of Dental Examiners, and license Chicago graduates and all other graduates from schools holding membership in the National Association of Dental Faculties; thus admitting that in their action in refusing to license these graduates from April 11 to November 6, 1899, they were in the wrong. Everything, consequently, in the Diamond mandamus case has been brought to a satisfactory conclusion.

"The injustice the Wisconsin State Board of Dental Examiners has done your graduates, yourself, and the many schools involved cannot be easily forgotten, but our success in securing all we contended for is an assurance of the justice of our cause.

"Dr. Diamond's license has been issued on our assurance that he would discontinue the case, the stipulation to withdraw the suit has been signed by both parties, the whole matter is now closed up, and the litigation is a thing of the past.

"Yours truly,

"QUARLES, SPENCE & QUARLES."

(Signed by the committee.)

A. O. HUNT,
W. C. BARRETT,
HENRY W. MORGAN,

Law Committee of the National Association of Dental Faculties.

November 22, 1899.

PRELIMINARY EXAMINATIONS IN MISSOURI.

To the Editor of the Dental Cosmos:

Sir,—Owing to the fact that Section 2 of new Rule 8, adopted by the National Association of Dental Faculties at Niagara Falls, fixes the requirements for entrance into all associated colleges the same as required by the State Board of Dental Examiners for the state of Missouri, I am frequently asked for an exact copy of the rules of the Missouri Board for conducting preliminary examinations.

To comply with a request so general, will you kindly publish our rule in full on that point? It is as follows:

Article II.

Section 1. All colleges operating in this state must comply with the rules as stated in Article I, of the "Rules for Colleges." Also with the following demands of this board, before their graduates will be granted a board certificate.

1. Students applying for admission to a dental college in this state, who cannot present a certificate as required by Rule 2 of Article I, shall then submit themselves to an examination as indicated in Rule 2, Article I.*
2. These examinations must be conducted by a person appointed by the State Superintendent of Public Instruction, through the secretary of the board.
3. It shall be the duty of the person conducting these examinations to make a verified report to the dean of the college, giving applicant's full name and average grade made by each applicant, and to the secretary of each board a duplicate report with each applicant's examination papers, which shall be kept by the secretary for a period of four years, subject to inspection at any time.
4. The average grade of an applicant shall be seventy per cent. before he can be admitted to any dental college in the state of Missouri.
5. It shall be the duty of the secretary of this board to notify the dean of the colleges, whose applicants have been examined, of those who have made the required grade, and are entitled to enter the college as students in the freshman year class.
6. The deans of colleges admitting students into the junior or senior year classes must in each case make a verified statement to the secretary in regard to the qualifications upon which each student was admitted.
7. All expenses incurred in examination of students must be paid by their respective colleges.
8. It shall also be the duty of this board to elect two of its members each year to inspect the dental colleges in this state, and they must make a written report at the May meeting of the board as to their equipment and teaching qualification.

Any further information as to the details of the examination will be furnished upon application.

S. C. A. Rubey, *Sec'y. State Board of Missouri.*

ALKALINE DENTAL CARIES.

To the Editor of the Dental Cosmos:

Sir,—Every scientific thinker in our profession must have been more or less surprised at some of the contents of Dr. S. A. Hopkins's article which appeared in the Periscope department of the

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*Rule 2, Article I, sets out the standard of admission,—certificate of entrance into second year, high school, etc.

October number of the DENTAL COSMOS. Your editorial in the same number has logically answered some of the deductions of Dr. Hopkins's researches, which will be open to general criticism when they appear in full.

My motive in writing these lines is to call attention to an old story which seems to have been forgotten by some of our modern investigators. It was Professor W. D. Miller who some fourteen years ago established the fact that the same bacterium may at one time cause an acid, at another time an alkaline reaction. He taught us at the same time that the course of fermentation frequently depends more upon the substratum than upon micro-organisms. Bacteria which occur upon the white of an egg, producing an offensive smell and a strong alkaline reaction, when brought into carbohydrates exhibit entirely different fermentation,—viz, acid reaction and a total absence of bad smell. I refer your readers to Professor Miller's book, "Micro-organisms of the Human Mouth," page 105, in which he plainly states that the fermentation of carbohydrates results in an acid reaction of the medium, while decomposed albuminous substances are accompanied by an alkaline reaction. As a *rule,* mixtures of both produce an acid reaction.

We must not forget the fundamental teachings of long ago, and remember Ben Akibas's saying, "All things happened once before."

R. H. HOFHEINZ.

BUFFALO, N. Y., November 29, 1899.

TEETH OF INDIAN NATIONS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—On page 725, paragraph three of Mr. Chas. H. Ward's article on the "Evolution of the Patient," in the DENTAL COSMOS for August, 1899, the author makes the following statement: "while among the descendants of the oldest civilization the world has ever known—that of India—the third molars never erupt in fifty per cent. of the population." The statement quoted is evidently from a man who has not been in India; had he been he would not have made it. My experience is that the natives of India, from the Brahmin to the Pariah, have uniformly large, strong, and exceptionally well-developed teeth, with the third molars and lateral incisors developed proportionally with the other teeth. In the hundreds of dentures that I have examined in the mouths of all castes of Indian natives I have never seen a single malformed third molar or lateral incisor, and these teeth were always present. The natives of India do not lose their teeth by caries as do the civilized white races. Practically the sole cause of loss of their teeth is through pyorrhea alveolaris, and that at an early age (between thirty and forty usually), the pyorrhea being caused by excessive calculary deposits which they do not attempt to remove, and the constant use of the betel leaf and arica nut, which they chew as Americans do tobacco.

J. W. EGBERT (D.D.S., Chicago).

ILLINOIS BUILDING, MOUNT ROAD, Madras, India.

AN ANSWER TO DR. LEONARD'S REPLY.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—On page 1150, November (1899) DENTAL COSMOS, is a communication which calls for some attention. For the benefit of the readers who do not know me, I desire to say that every word written by me and appearing on page 1043 of the DENTAL COSMOS for October, 1899, is as true as it is that the sun shines.

It is true he did take lunch with me on December 14, 1897. After lunch was over he turned the conversation so that the measurement of cavities was spoken of, and I well remember the conversation. Here are his exact words: "What would you say if I should tell you that I also had discovered that approximal cavities should be cut two-thirds, palato-lingually, as broad as the tooth was thick in that direction?" I answered, "You never discovered anything of the kind." He repeated the above statement four times. At last I said, "You know well where you obtained the rule for preparing approximal cavities two-thirds as broad, linguo-buccally, as the tooth is thick in that direction. So far as your 'palato-lingually' is concerned, I know nothing about it." Not another word was spoken in regard to this subject at the time, nor was there any reference made to the work of Drs. Black and Williams. We left the café immediately. After walking a square and a half, and just as we were parting, he handed me a journal with this remark, "This contains an article of mine. I hope that it will interest you and that you will not be dissatisfied. I will see you soon again. Please return the journal when you are through." I had no more idea what was in that journal, nor the use he had made of the rule which I had communicated to him, than the man in the moon. As soon, however, as I saw what he said, I wrote the editor of the journal stating the circumstances, and there the matter dropped. Since December 14, 1897, Dr. Leonard has never entered my office; nor have I exchanged words with him, from that day to this, with two exceptions. (I have always answered any questions he might ask me at public meetings, but this is not to be considered.) I did write him asking some questions, for this reason: In the essay he read to the men in California, he stated something like this, that fifty prepared approximal cavities gave him the two-thirds rule. He had had a dentometer for so short a time before going to California, that I was simply astounded that any man would dare make a statement of that kind.

About the 12th or 14th of June, Dr. Leonard brought me his dentometer and stated, "Before I go to work with this, I wish you would examine it and see if it is correct." It took but an instant for me to ascertain that it was .3 out at one millimeter, .6 at two millimeters, and the ratio continued accordingly, so that at six millimeters it was 1.8 millimeters out of true. The instrument was returned to the maker and was repaired. It was not again in Dr. Leonard's possession until the 21st of June. Dr. Leonard left his home for California between the 28th and 30th of June. Let us assume it was the 30th. He had, therefore, from the 21st to the

30th in which to prepare fifty approximal cavities. No, not all that time, for he spent one day in the Twin Cities and the 27th of June came on Sunday. According then, to his statement, he prepared fifty approximal cavities in bicuspids and molars in six days (for he told Drs. Lyon and Weeks of "his discovery" two days before he left his home for California). These cavities were two-thirds as broad, linguo-buccally, as the teeth were thick in that direction. If he prepared these cavities, he certainly filled them. If he did this, it is one of the greatest, if not the greatest record of rapid work my attention has ever been called to.

For the benefit of those who are not posted on the system of measurement, I will say: It is an impossibility to measure cavities correctly unless a dentometer is used. I originated the system of measurement, and have tried a great number of other appliances for a simplification of this work, but all have been found wanting. There is just one instrument that can be used to obtain the correct linguo-buccal width of a cavity prepared in a tooth, and that is the dentometer illustrated on page 982, December (1897) DENTAL COSMOS.

I said in my former statement that Dr. Leonard violated the confidence I reposed in him by publishing the rule for cavity measurement, which I discovered and communicated to him. This he denies. After I communicated the rule, Dr. Leonard left this office and went at once to that of Dr. L. W. Lyon, of this city, and told him of "his discovery." From Dr. Lyon's office he went to Minneapolis and communicated the rule to Dr. T. E. Weeks. The latter at once made a large plaster of Paris model containing the crowns of several teeth. Dr. Weeks prepared in the molar a mesio-occlusal cavity. In the adjoining bicuspid he prepared a disto-occlusal cavity. When these cavities were completed, Dr. Weeks took the model into the office of Dr. F. B. Kremer, of Minneapolis, and asked Dr. Kremer, "How do these approximal cavities correspond with the rule Dr. Wedelstaedt is teaching the men of his class?" Dr. Weeks then sent this model to Dr. Leonard. Dr. Leonard took it with him to California and exhibited it at the Pacific Coast meeting. He asserted that it was his preparation, and illustrated his method of dealing with approximal cavities. Nor is this all. He called the attention of a large number of dentists in this state to the model, and told them also he had prepared those cavities. At the same time, Dr. Weeks was telling others he had prepared those cavities for Dr. Leonard to take to California. This Dr. Leonard had done, and had fooled the men of that state. Acts of this kind are what I call violating my confidence. It is very remarkable that Dr. Leonard could not prepare his own cavities in the model if, as he asserts, "preparing fifty cavities in molars and bicuspids gave him the two-thirds rule." Why then did he seek the assistance of Dr. Weeks? When Dr. Weeks made a second model for Dr. Leonard to be used in connection with his essay read at New Orleans, why did not Dr. Leonard prepare cavities in it? (Dr. Weeks refused to do so.)

There is still another very peculiar phase for the readers to take into consideration. In Dr. Leonard's essay read in California, he did not allege he discovered the rule. He gave his hearers the rule, pure and simple. He did not give any data. This is also true of his second essay which was read at New Orleans. Where a person makes a discovery that is of importance, data, as a rule, are given.

In his essay published in the September (1899) DENTAL COSMOS, is the following: "The December DENTAL COSMOS contains an article by another dentist arriving at the same two-thirds rule, entirely unconscious of my previous finding." This needs some attention. I have in my possession some approximal cavities that Dr. Leonard prepared in bicuspids on April 14, 1897. These are not prepared two-thirds as broad as the teeth are thick. At that time I was teaching that method of preparing cavities (two-thirds as broad as the teeth were thick, linguo-buccally), but I had not communicated the rule to the men. A comparison of this statement with my essay in the December (1897) DENTAL COSMOS will be interesting.

There still remains some evidence in my possession that can be used, but what has been said is sufficient to prove all that is necessary. At least it is a plain statement of the facts. Each and all can be verified, if necessary. E. K. WEDELSTAEDT.

NEW YORK LIFE BLDG.,
St. Paul, Minn., December 1, 1899.

PROCEEDINGS OF SOCIETIES.

MARYLAND STATE DENTAL ASSOCIATION.

THE first quarterly clinic of the Maryland State Dental Association was held in Royal Arcanum Hall, Baltimore, Md., on the afternoon and evening of October 26, 1899. The afternoon session was devoted to clinics.

Evening Session.

Dr. E. P. BEADLES, Danville, Va., read the following paper:

WHAT IS THE STATUS OF THE DENTAL PROFESSION?

The most unfortunate thing that ever happened for dentistry was the establishment, as such, of the first dental college. The true history of this movement will probably never be known, but the circumstances strengthen the theory that it was done through a feeling of pique. Dr. Chapin A. Harris tried to establish a chair of dental surgery in the medical school of the University of Maryland. The authorities would not agree, hence he founded a new school and invented a new degree, that of Doctor of Dental Surgery. From that day to this there has been trouble. How much better it would have been to have tried another medical school, or to have had a little more patience and persistence; or, if a new school had to be established, how much better to have made it a true medical college, teaching dentistry as a specialty, retaining the old and already recognized degree of "Doctor of Medicine."

Other specialties have followed, but we hear of no special schools being founded for their especial benefit, nor of new degrees being devised. It is useless and illogical to try to make of dentistry a separate and distinct thing when it is merely a part of a recognized science. As we are, we wander up and down the face of the earth, known and owned by no one, and, what is worse, we are divided among ourselves as to what we are. Some claim that we are a part of the medical profession; though we have separate schools, a different degree, and distinct laws. Others assert that we have no part with the medical fraternity and do not desire any. It is even questioned by some whether we have a right to administer medicines internally. What is the definition of a "physician"? To a plain man it would be, "One whose business it is to cure the diseases of mankind, especially by the administration of drugs." Every intelligent dentist knows that he cannot do his best for his patients unless he is allowed to administer medicines internally.

No one will deny the great advancement of dentistry; but it cannot claim, with truth, itself to be a profession. Upon what would such a claim be based? How are we known? It is thought by many that "D.D.S." means the dentist, the man who "cleans and fixes teeth." To the minds of a few, and a few only, it means a man trained in the science of medicine and who has chosen the oral cavity for his specialty, a man of education and attainments. Then we have the "L.D.S."; who is he? About the same as the other. The "D.M.D."; what is his vocation? "Cleans and fixes teeth." How about the "M.D.S."? A Master of Dental Surgery, surely he must be the best of all; but his degree, like the "L.D.S.," lays no claim to the title of "doctor." There are some who have adopted a high-sounding name, which inspires something like awe in the minds of the ignorant,—"Stomatologist." Can we define him? "One who cleans and fixes teeth." Despite the Greek, we get no further than this. So we find ourselves in a muddle, we do not even know our own name. We lay claim to grand things, but to a stranger we cannot tell by what title we are known. Does the oculist, the aurist, or the rhinologist have any such trouble? Has any one of them any more claim to be known as practitioners of medicine than the dentist? Does either of them have occasion to administer medicines internally oftener than the dentist? Do they perform more surgical operations than we do? No; but they have shown more sense. Instead of establishing a separate school and forcing a new degree, they have been content with plain "M.D."

If those are right who claim that we have no part nor parcel with medicine, even then we have no real claim to being a profession, as a whole. There are professional men among us; but we must be judged by the majority. In the first place we have the purely mechanical so mixed with the scientific that no man can tell them apart. This is necessary to a certain extent, I admit. So with the surgeon. He must construct apparatus, and do it with his own hands, with which to accomplish his purposes; but surgeons do not make wooden legs. He prepares the stump and sends the patient to an artist. So it should be with us. The dentist should give his time to the mouth and the natural organs; when artificial ones are needed he should make the necessary preparation and send the patient to an artist.

I have, on previous occasions, given what I believe to be the true difference between a professional man, of any profession, and a tradesman. The former has the good of his patients in mind first, the remuneration second; with the tradesman this order is reversed. How many dentists feel the true professional spirit? I heard a member of the American Dental Association say, "Do you think I am in this business," meaning dentistry, "for my health?" In other words, he was "in it" for what he could make out of it in dollars and cents, regardless of all other considerations. Can you call this a profession when a majority of its members feel this way? But what examples do our young men have? What are they to think when they receive flaming circulars from certain leading schools? Is it likely that the boy will have higher ideals than his teacher? What is your opinion of the advertisements recently published in a dental journal, of certain colleges begging for patients during the vacation? Nothing more nor less than an advertisement of cheap dentistry. These schools are members of your Faculties' Association, their teachers hold offices in our state and national associations, and they condemn individuals for this same reprehensible practice. Why should the schools escape?

Then see some of our journals. Is it possible to expect ethical teaching from a trade journal? Surely, we can never lay legitimate claim to high things until we have a larger number of journals which teach us professional morals. It seems to me there is much to change in our manners and in our methods. Dentists are the greatest braggarts on the earth. They are always busy, they all have a tremendous practice, and always among the very richest and best people. Is it any wonder that our schools are filled with poor, ignorant, deluded young men, when they have heard so much of this talk from dentists? It is a puzzle to me where the people of little means go for the services of a dentist; I've never heard of one who did their practice.

Dr. H. J. McKellops, at the last meeting of the Southern Branch of the National Association, said, "I have attended more association meetings, and have traveled more perhaps for the purpose of attending those meetings than any one here present, and I want to say right now that medical schools do not recognize dentists as oral surgeons when they have only the dental degree. And how can it be otherwise when we recognize the fact, which cannot be denied, that dental diplomas and dental degrees are to be purchased by any one who has a few dollars to put up? In some states dental practitioners are taxed annually on the same footing as the butcher and the baker. We must take some action in this matter."

The gentleman is unquestionably right. So much has been said about the "great advancement of dentistry" that we are contentedly patting ourselves on our backs and trying to believe that we are working wonders. We are too much like our troops in the Philippines, scoring wonderful successes, smashing the poor rebels every time, but have never gotten out of gunshot of Manila. There is such a thing as advancing in the wrong direction, or a part going forward and the rest going backward.

I see no way out of our troubles except to do our first works over again. No one will deny the right of a practitioner of medicine to practice dentistry, as was decided by the courts in the case of H. P. Beck, of Newport, R. I. If a man has the right to practice upon the whole body, how can a part be excluded? Our maxims in geometry will teach us this.

We should abandon forever all so-called dental degrees and confer only "M.D.," giving our students a special course in oral surgery, dental surgery, or stomatology, whatever name you may prefer. There would then be peace; we would start on an equal footing with all; we would not be claiming "recognition," whatever that may mean, by the medical profession, for we would be the medical profession itself. The constant friction now going on would cease; harmony would prevail. We would know who and what we are, no longer a poor bastard, wandering up and down the face of the earth. Social and professional ostracism would probably drive out the "dental parlor," the advertising dental infirmary, as well as the "painless extraction" man. Can't be done? Where does the homeopath get his degree? Is it not "M.D."? Is he not wholly in opposition to the orthodox school of medicine? It is absolutely necessary for him to have a separate school, but he had sense enough to adopt the same degree; and surely, even as we stand, we have as much right to this degree as the homeopath.

But how about the law? The same old puzzle is there. The greatest jurists cannot agree as to what we are. We seem to be some monster that cannot be classified. Our laws say that physicians are exempt from jury service, and in many cases dentists are excused, presumably on this ground. Only recently I had a tussle with a judge in my town over this question. He seemed to have the idea that I would make a good juryman. I had never served. He looked into the law and found that dentists were not specifically exempted, and had me summoned. I was very busy,—all dentists are,—hence I hired a man to take my place. Having procured a favorable decision made by another court some years ago, also a carefully prepared affidavit as to my preparation and practice, I laid the papers before his Honor. Fortune had it that just about the time the decision was to be rendered a baseball bat came to my help, fracturing a central incisor of the eleven-year-old son of the judge. He brought the boy to me, doubtless influenced by that affidavit. The pulp was left protruding from its cavity; the boy was disfigured. You may be sure I made use of my opportunity. All the learned terms at my command were brought into use. The diagnosis was made and the prognosis announced. The judge left much impressed. In two days I had my decision,—viz, that I am a physician, and doubtless the judge thought that I ought to be a "professor" in a college.

A similar case, that of Adam Flickinger, was carried to the Supreme Court of Missouri, with a different result. The decision by this court was that a dentist was not a physician, and that he could not be excused from jury service. Among other things, the learned judge who wrote the decision says, "Relator evidently feels unsteady on his logical legs if his sole reliance is to be on the statutory exemptions heretofore noted, and so he resorts to the lexicographers and quotes from the 'Century Dictionary,' where 'dentist' is thus defined: 'One whose profession it is to clean and extract teeth, repair them when diseased, and replace them when necessary by artificial ones; one who practices dental surgery and mechanical dentistry; a dental surgeon.' If relator had delved a little more deeply into the science of definitions and had turned to another page of the same work he would have found, 'Chiropodist.—One who treats diseases or malformations of the hands or feet; especially a surgeon for the feet, hands, and nails; a cutter or extractor of corns and callosities; a corn doctor.' So that if relator is exempt from jury service because, as he says, he treats professionally diseases of the oral cavity, so also is his less pretentious professional brother, who, with equal scientific skill, treats diseases or malformations of the hands or feet, and who is content to be dubbed 'corn doctor.' Certainly the argument and definition which would support the exemption of the dentist as a 'practitioner of medicine and surgery' would also equally support that of his cognate scientist, albeit of humbler professional pretensions. The disposition of persons to magnify and exalt their callings or occupations has become wonderfully prevalent in these latter days. He who shoves a jack-plane and wields a saw is no longer a 'carpenter,' but an 'architect and builder;' the solicitor of orders from our retail merchants is no longer a 'drummer,' but a 'commercial traveler;' and the loquacious individual who scrapes your chin is no longer a 'barber,' but a 'tonsorial artist.' But this euphemistic style of dressing things in different and more high-sounding verbiage does not alter their essential nature, nor have the least tendency to evade the force and effect of the statutes pointing out those who are subject to jury duty and those exempt therefrom.

"The premises considered, we hold that, on the facts presented in this record, relator is not exempt from jury duty, and hence deny the peremptory writ."

All of which goes to prove that what I have set down here is true. The above shows you how we are regarded by a supreme court. Should we not make it impossible for such an opinion to be held?

Dentistry has a long history, but always in the past as a specialty of medicine,—*i.e.,* until that unfortunate blunder of a dental college and that new invention, the "D.D.S.," etc. It is a wonder that the "corn doctor" referred to by the learned judge has not established a degree, "C.D.," for instance, or "D.C.S.," "Doctor of Corn Surgery."

Herodotus found physicians in Egypt who made a specialty of the teeth. The Romans must have suffered from Riggs's disease, as Mæcenas, the patron of Horace, complained of his "loose teeth." It seems that prosthetic dentistry was also known to them, as Horace refers to the "false teeth" of Canidia when she is practicing her orgies in the graveyard on the Esquiline. Having a place in classical literature, and commanding the thought and attention of many men of ability, dentistry deserves something better than it is getting.

Why the expense and trouble of so much legislation and dental examining boards? One dentist added to the medical boards, as one practitioner of homeopathy is now added, and the work is done. We could rid ourselves of this everlasting and nauseating trouble between Examining Boards and Dental Faculties Association. Peace, blessed peace, like a dove, would hover over us, and with united efforts we could go forward accomplishing results otherwise impossible.

Discussion.

Dr. W. W. DUNBRACCO, Baltimore, said he desired to thank Dr. Beadles for the interest he had taken in this meeting, and for the paper he had just read in our presence. He has made a great sacrifice to come here from his home in Danville, Va., and we appreciate his presence. His paper is a plain and startling declaration, and the impression is suggested that it contains truths that are unwelcome, inasmuch as they shatter the pedestal on which our idol stands; and if absolutely true would stop the wheels of professional progress and development and degrade a young but noble profession.

After reading the doctor's paper, he regretted the committee had selected him to open the discussion, for he realized his weakness, and he had hoped some more capable, but not more zealous, devotee of dentistry would challenge his statements and uphold the dignity of our calling.

There are some statements the essayist makes from which he most respectfully differed. The claim that the dental fraternity, in order to be distinguished as a professional body, must first seek recognition and obtain indorsement of the medical profession because our duties relate to a part of the human anatomy of which they claim the whole,—a part wofully neglected until dentists devoted their time and efforts thereto,—and the fact that certain jurists have declined to exempt dentists from jury duty in some states, do not warrant or justify the assertion that we are not a profession.

If we have pursued the plan outlined by the founders of the Baltimore College of Dental Surgery, and accomplished what they designed we should,—namely, to make dentistry an independent profession, and to earn recognition as such from the other learned professions through scientific research, indefatigable labor and thought; if we have solved problems relating to the pathological conditions of dental organs and the oral cavity, and discovered laws of therapeutics by which we may successfully arrest lesions destructive to these organs, and by surgical treatment ward off diseases incident to the teeth; if we have made a literature for ourselves, as we are constantly making, and are diligently striving to instill the spirit of professional ethics and morality into our membership by dental associations, then he thought we have just claims to professional standing.

Dentistry is too broad to be considered a handmaid of medicine, and for this reason he believed that Chapin A. Harris and Horace H. Hayden made no mistake when they decided to inaugurate a school for its study independent of medical institutions. Is it not proper that a school founded for dental instruction should have a suitable degree to confer on those who have successfully pursued the required curriculum? The title "D.D.S." (Doctor of Dental Surgery) seemed to be aptly and correctly chosen.

It may appear unfortunate that all dental colleges did not use the same degree, but the fact that we have the D.D.S., the M.D.S., the D.M.D., and the L.D.S. does not warrant the essayist to announce that we are a nomadic body, "wandering up and down the earth, known and owned by no one, not even knowing our own name." The various titles meaning one and the same practitioner only emphasize, besides the profession, the university or college from which we may have been graduated. We find the same to be true of other professions. In law there is the LL.D., the J.U.D. (Doctor Utriusque Juris), and the D.C.L. The English University at Oxford confers degrees in the form of D.C.L., while those at Cambridge and London use the forms of LL.D. Likewise the theological institutions; there are various degrees designating the same calling,—the S.T.D. (Sacrosanctæ Theologiæ Doctor), the D.D. (Doctor of Divinity), and the T.D. (Doctor of Theology). The degree M.D. the essayist would have us obtain as a universal title would mean nothing to us; would not even represent our labor and thought. Dentists would still have to announce after their names the word "dentist." A public uneducated to the meaning of existing titles would as readily mistake us for practitioners of general medicine.

He claimed dentistry to be a profession because its members have developed, after years of deepest research, scientific conclusions and laws that are no longer empirical, but knowledge. Its two hundred volumes of standard works, besides numerous monographs evolved from intelligent brains, that have appeared in the present century, more than were ever written from the time of Galen, who wrote in the second century, to the present, and which are used in medical as well as dental colleges, justify us to claim distinction as a learned and independent profession. Our advancement in thoughts relating to dental histology, microscopy, pathology, and therapeutics, fields of incessant work and progress, entitle dentistry to be considered more than art and handicraft. The DENTAL COSMOS for this month (October, 1899) finds the *New York Medical Journal* speaking of us as follows: "It is not as a skilled and ingenious workman alone or even chiefly that the American dentist is to be regarded. He occupies a place second to nobody else's as a scientific investigator." And then suggests that medical men attending our dental meetings "would pick up information" that they might find of advantage in their own work. He was sorry the essayist had in mind the ordinary advertising dentist when he penned his paper. If he had before him the general practitioner who loves his profession, and labors zealously for its advancement and for the general weal of the public, he did not believe he would have said "dentists are the greatest braggarts on earth," and intimated "their first idea was remuneration and their second the good of the public." A friend (a dentist) not long ago, needing legal advice, sought the services of one of the leading attorneys in this city (a man of national reputation), and the first thing the lawyer said was, "Young man, my services are worth twenty-five dollars an hour." Must we conclude from this that lawyers are only mercenary, and lose sight of their high and noble calling? Not at all.

A few years ago, when the census of 1890 was being compiled, it was ordered that dentists be tabulated as mechanics. Who knows this better than the dentists of Baltimore? And who does not remember the persistence of the Superintendent of Census to rate us as mechanics and not as professional men? The dentists of this city vigorously protested. You all know the history. But, after all, was it not Mr. Porter, the superintendent himself, who, recognizing the ability and standing of the dentists, had the Wilcox bill modified so as to exclude dentists, and dentistry was classed among the professions? The essayist himself, a gentleman and scholar, had little trouble to convince his local judge of the importance and high calling of the dentist, and was excused from jury service, like other professional men.

Dentistry is a legitimate and recognized profession, and he would as readily believe this nation of ours, that a century and a quarter ago left the mother land to begin a new nation under the Stars and Stripes, was a bastard as that dentistry is a bastard profession.

Dr. Williams Donnally said that he felt that it was a very serious subject that was brought up before the meeting, and he was not surprised that the essayist recognized the deplorable situation of the profession. He agreed with him in part, but not entirely. He felt that the founders of the first dental schools did make a mistake, but it was done because of the prejudice there was at that time against specialists in medicine, a prejudice that is disappearing rapidly at this day. He doubted, however, whether it would be practicable now to drop the degree of D.D.S., that has represented so much work and thought and progress in our world, and go back to the medical degree. If our degree was the same as the physician's we might in many cases have a better social standing, though the specialization of medical practice is growing in favor; and there is an ever-increasing tendency for the specialists to separate from the medical profession, not in education nor in degree, nor in the college course, but in association. There are in the American Medical Association several sections with much smaller membership than have the independent associations of the specialists represented in these sections. He felt it would be better if dentists could gradually get back to the medical degree, but it would not be possible to drop the D.D.S. at once.

Dr. W. W. Evans, Washington, said that in his view dentistry was a distinct profession, and the degree of D.D.S. was an honorable one, and the desire to change it was to be deplored. Among the very best dentists in all parts of the world the majority are those who have nothing but the degree of D.D.S., and those from the old original college here in Baltimore are well and numerously represented among the best. He was satisfied that the dental schools gave a better dental education than did those that were connected with medical colleges or universities. The latter give too much theory, and not enough of the practical; too much that has nothing to do with dentistry, and too little of that which is necessary for successful practice. It is none too long for a man to give all his attention to dentistry alone for the three years of the college course.

Dr. Richard Grady thought that the dentist, like all other specialists, should be a graduate in medicine. This would furnish him a broader foundation of knowledge and enable him to do his duty more thoroughly by his patients. Three things he always associated as necessary in a professional life, liberality, generosity, and culture. Culture was needed for a man to take a leading place in social and professional life, and he must be liberal and generous in thought and word in his dealings with his fellow-practitioners. He related how a professor in one of the colleges spoke sneeringly of another professor in the same institution in the presence of students, when a filling put in by his compeer fell out upon its being examined. Dr. Dunbracco says, "You all know the history of the effort of the Superintendent of the Census to class us as mechanics," and he goes on to say that Mr. Porter had the Wilcox bill modified; but it was not due to Mr. Porter that the bill was modified, but to the efforts of members of our own profession, beginning with the Baltimore dentists and seconded by those in other localities. He then read from the Transactions of the American Dental Association, 1895, page 167, in proof of the above statement.

Dr. Beadles, closing the discussion, said that he thanked the members for the attention they had given his paper, and that though he had not expected all would agree with him, still none had contradicted a single word that he had put in the paper.

No one loved his profession more than he did, but he felt that if that profession had anything wrong in it the wrong should be probed, and what could be done to better it should be done. He did not say we were after recognition by the medical profession, but he claimed we were the medical profession. He agreed that dentistry had done a great work and made wonderful advances, both in scientific and professional progress; that its history was a glorious history, and one in which dentists, and especially American dentists, should take pride. Still, if we are wrong in only a single point, we should get right in that point. The different titles in other professions which had been cited bore different shades of meaning, and this was the reason for them. He claimed that the majority of dentists were not professional men according to Dr. Grady's standard, but he claimed that the same training and education students get now in the dental colleges should entitle them to the M.D. degree. Only a few years ago this degree was given after a two years' course, and dental students have as much knowledge of medicine at their graduation as medical students had at that time. What he considered desirable was to have the present dental colleges have their charters so amended that they could confer the M.D. instead of the D.D.S. This subject had been debated frequently, but he had tried to clothe his ideas in such language that they would be impressed with his earnestness.

Dr. DONNALLY asked Dr. Beadles if he thought in case the dental schools granted the M.D. degree to their graduates, the degree thus obtained would carry the same social and professional standing as the medical degree from a medical college would?

Dr. BEADLES did not see any reason to doubt that it would.

The subject was passed, and the following paper was read by RICHARD GRADY, M.D., D.D.S., of Baltimore, Md.:

MERCURIAL POISONING AND AMALGAM FILLINGS. A MEDICAL VIEW; THE DENTAL ASPECT.

Mr. President and gentlemen, my interest has been aroused concerning the subject upon which I have the honor to address you this evening, by a paper on "Mercurial Neurosis resulting from Amalgam Fillings". read before a medical society in New York. That paper may stimulate some of us to an earnest study of the subject, and put in motion a new train of thought. It seems, however, a duty, in the light of what has developed on the dental side of the issue, to call attention to and record a protest against the views promulgated, in the hope of preventing serious consequences which may follow such teachings. Their publication and dissemination cannot fail to be productive of incalculable harm when regarded with respect to their effect upon dental practice. They are read by thousands, and have their influence according to the knowledge of dentistry which the individual reader has. Comparatively few understand the real worth of dentistry as represented by its progressive practitioners.

The fitness of amalgam as a filling-material has given rise to much discussion and a large amount of experimental research. The odium attached to it is largely due to its misuse. Bromin, arsenic, prussic acid, nux vomica, cantharides, digitalis, conium, opium, and particularly iodid of potassium, have produced salivation; and in the face of this statement ("Forensic Medicine and Toxicology," Woodman and Tidy), why is the mercury in amalgam fillings made to bear so great a burden?

The author referred to wants to show that the use of amalgam, by mercurial poisoning, seriously affects the nerve-centers, impairs locomotion by heaviness of limb and stiffness of joint, gives rise to obstinate diseases of the skin, and makes a mental wreck of its victims, whose imaginations and hallucinations are more than his pen can describe. He admits that it requires considerable nerve for the physician to insist upon a patient's enduring the "agony, torture, and expense" of having amalgam fillings removed and gold fillings inserted.

Physical examination, he says, reveals nothing to assist the physician in making a diagnosis of the case, because, as you know, neurosis is a disease not accompanied by any appreciable change of structure. There is, however, nervous depression, irritability, unreasonableness, an inability to overcome and throw off the feelings of oppression which settle upon the patient and hold him as in the clutches of despair until his ambition is broken, his energy is gone, his purpose is lost, and he drifts for lack of power to concentrate his actions and assert himself as a force in the world. There are shifting, shooting pains, here and there, from head to foot, affecting sometimes one part and then another; numbness of hand, foot, or jaw; heaviness of leg, arm, or head, with an almost inability to move them, and a feeling as though one would fall or lose consciousness. Again, there is a mental excitability as well as mental depression; perplexing events causing the highest degree of excitement; ordinary conversation sometimes causing complete confusion; headache, palpitation, intense solicitude and anxiety without reason for it. Such are some of the symptoms said to be attending these cases.

To bring the pathological conditions more clearly to the thought of his hearers, the author cited five cases which had come under his observation; also alluded to his own case, and said further that he could describe several other cases, in one of which the fillings had been in between twenty-five and thirty years and the toxic effect manifest for twelve years. He doubts not that insane asylums have many an inmate of a mental state developed by amalgam fillings, which produced excitation or sluggishness of brain, impaired thought, destroyed memory, blunted perception, and relegated to despair what might otherwise have been a bright and brilliant career. In passing it might be remarked, on the other hand, that it is charged that the nervous strain of long-continued operations of gold fillings has produced its quota of inmates in early graves and insane asylums. Every observing dentist knows that some patients are extraordinarily susceptible to shock. There may be some special reason for a sitting of three or four hours. You all know Dr. Black's case of a young woman of fine physical development who after three hours' continuous operating and a rest of two hours was in a "stupid condition," and more or less an invalid four years after the incident.

Having read this physician's paper with great interest myself, it occurred to me that a *résumé* might prove profitable to the members of this association for discussion. I shall try to dispose of the cases almost as briefly as Bret Harte in his "Condensed Novels" did of some of the characters in Charles Reade's "Handsome Is as Handsome Does":

1. Mr. and Mrs. Dodd (dead).
2. Mr. and Mrs. Harden (translated).
3. Ruby (I don't know about; he came of a long-lived family, and the gout is an uncertain disease).

Begin with his own case of physical and mental collapse, which he believed was due to several amalgam fillings; that is, the mercury absorbed from those fillings. Two weeks after the removal of the fillings he felt like another man. Having absorbed mercury from those fillings, which he carried for thirty-eight years, he can appreciate the sufferings of others when they rehearse experiences which he had realized; consequently he readily recognized the same enemy to their peace and happiness which had shattered his own.

Case 1. Miss F., age thirty-three, in excellent health previous to an attack of *la grippe* four years earlier. Numbness of hands and stiffness of jaws led to examination of teeth. Found five amalgam fillings which he believed had caused mercurial neurosis. She steadily improved on removal of the fillings, and had not been so well in five years.

Case 2. Miss E., whose sluggish gait, heaviness of limbs, and stiffness of jaws led to examination of mouth and the finding of nine amalgam fillings. Gold substituted and she became animated and has continued to improve, although still suffering from the effects of the absorbed mercury.

Case 3. A young lady, restless, sleepless, irritable, hysterical, etc. All her functions normal; had sixteen amalgam fillings; several of the teeth contained gold fillings. The fillings were removed; the young lady improved, all her nervous feelings disappeared, and she manifested none of her nervous troubles after the removal of the fillings.

Case 4. Mrs. N., extremely nervous, with neuralgic pains in the chest and palpitation of the heart. Examined her teeth and found one large amalgam filling in a lower molar. On its removal immediately she felt better. She concludes a letter to the doctor with these words:

"Oh, Doctor, how I wish I had taken your advice last spring and saved myself the sufferings of the summer and fall! I wish I had never had it put in my mouth. No dentist would put in another for any amount of money. I want to thank you with all my heart for insisting upon my having that filling removed and bringing brightness again into my life. Days when I feel well I am the happiest woman living. I only long to feel entirely well, and trust as the poison passes off that I shall."

Case 5. Mrs. H., age twenty-six, very excitable, afraid to go out alone in the street and stores lest she become unconscious and be taken to some hospital; stiffness of jaws, left side of head and ear numb, large toe of right foot numb; nine amalgam fillings believed to be the cause of her condition. Removed and replaced with gold or "bone." In one week she improved, in three weeks hardly believed to be the same woman. Gained twenty pounds in weight after the removal of the amalgam fillings. Nine physicians had previously treated her.

Cases similar to this physician's are being constantly brought forward in our own city.

I am not prepared to express any opinion as to the extent to which similar views are held by medical practitioners generally. The deductions of physicians when not supported by conclusive evidence may be mistaken. Since the question first became a matter of dispute, the controversy has led to many and various opinions being entertained. It can scarcely be said that the views expressed in the paper mentioned have been universally accepted; and yet in discussing it I lay myself open to questions I may not be able to answer, and to arguments I cannot demolish.

Dentists, as is well known, use amalgam freely. Without doubt more amalgam than gold is used to-day, and amalgam fillings outnumber gold. There is hardly a dentist in practice who does not use it. Some dentists maintain an aggressive attitude toward amalgam, and claim never to use it under any circumstances; and some hold the opinion that its use has degraded operative dentistry.

Tons have been used, and no injury has ever been proven to have been caused by it. In very susceptible constitutions it is reasonable to believe that it may exert an influence on the general system. My friend Dr. Talbot, of Chicago, says that he is an instance of unusual susceptibility to mercurial poisoning, and that if he should rub up two amalgam fillings in the palm of his hand each day for three successive days he would be attacked with *paralysis agitans;* but it is beyond conception that the mercury from an amalgam filling should be absorbed by the dentinal tubuli and go back into the system to work harm. That mercury is absorbed by the tubuli of the teeth has been proven by extracting the globules from the dentin of teeth long filled with amalgam (so says Dr. Junkerman); and that when mercury is used in excess in copper amalgam oxid of copper is formed, which prevents absorption by the teeth. As to the effects of mercury, we all know (says Dr. Allport) that teeth long filled with amalgam become brittle, showing that mercury has affected the structure. This effect, it seems, must be from the evaporation of the mercury, and escape of the vapor would be in the line of the least resistance; that is, between the filling and the tooth.

About the year 1826 "silver paste" was advocated in France for permanent fillings in teeth. This preparation was first brought to notice in the United States through the advertisements of two Frenchmen, who called it "royal mineral" replacer or substitute. It was soon proven that, instead of being a mineral compound, it was purely metallic, and consisted of silver and copper rendered temporarily plastic by the addition of mercury. It was easily manipulated, and they were enabled to fill a class of teeth, with frail and broken cavity walls, such as had never been attempted by the most skillful surgeons.

Scientific investigation at last was imperative, and as a result the foremost men who had been arrayed against it now became the ardent supporters; among whom was the president of the American Society of Dental Surgeons, who found that the cry of mercurial ptyalism was not supported by facts. This investigation gave birth to an organization called the "New Departure Corps." Its work gave to dentistry what is known as the "new departure creed," expressed in the following statements: *"In proportion as teeth need saving, gold is the worst material to use." "Abolish gold! Use nothing but amalgam!"* These men did much to improve the formula for amalgam alloys. It has gone through many changes, until now the following is recognized: Silver, 60 to 70 per cent.; tin, 30 to 35, and gold and zinc, 5 to 10. The amalgams are essentially chemical compounds, the combination of mercury with the metals composing the amalgam alloy taking place in definite atomic ratios.

There was a time in the history of amalgam when it was worth a man's reputation to acknowledge its use. The fathers of dentistry fought to the bitter end the subject of amalgam fillings; one side to prove it harmless, the other to condemn its use. But I anticipate that my honored friend Dr. Volck, who is a connecting link between that day, which is happily past (when all who did not pledge themselves not to use amalgam were obliged to resign or be expelled from dental societies, and those who had been the best of friends became enemies) and the present, will speak of that time, from personal knowledge, in opening the discussion.

An ordinary-sized cavity will require say five grains of alloy. After adding say five grains of mercury and thoroughly mixing, one and a half grains of mercury can be expressed, leaving three and a half grains of mercury in a filling of eight and a half grains. The object in putting an excess of mercury in the mixture and then expressing the surplus is to facilitate a complete and thorough amalgamation. Such a filling placed in a properly prepared cavity makes what dentists recognize as a good filling, from which no mercury can be removed so long as it remains in the mouth. This is the consensus of opinion of all scientific practitioners of dentistry throughout the world.

It is claimed, however, as in the physician's paper quoted, that the mercury *does* get out, and is absorbed into the system, producing mercurial neurosis, ptyalism, etc. If any of the mercury could be removed from such a filling, it would no longer be a fit stopping for the tooth. It would be disintegrated, soft, and would fall out, either by mastication or the use of the tooth-brush. It is not found that amalgam fillings are acted upon that way. Fillings that have done good service for thirty years are as hard as the day they were inserted. The mercury can be removed by heat, but sufficient heat cannot be produced so long as the fillings remain in the mouth. The boiling point will not eliminate it, and the tissues of the mouth will not tolerate anything approaching that temperature; heat is excluded.

As to the action of iodin on amalgam, Dr. Bogue says, "I did not make any experiments at all relative to the systemic effects of iodin upon mercury which had entered the system from amalgam fillings in the teeth, perhaps because most of the patients for whom I have the honor of operating have not during my time been subjected to a dull red heat, which is about the temperature required to produce either of the two poisonous salts of mercury." And Professor Blythe says, in speaking of amalgam, that the mercury is in a state of combination too powerful to be attacked by the fluids of the mouth.

That serious consequences will sometimes follow the insertion of any filling-material placed in a cavity of a tooth is admitted, but such results are not due to the *nature of the filling-material,* but to the *condition* of the tooth at the time of filling; for instance, (1) the pressure of the fillings on exposed pulps; (2) where a filling is inserted over a devitalized pulp; or (3) where the pulp has been removed and the canals not properly sterilized. The results are facial neuralgia, shock from thermal changes, pain on percussion, pericementitis, alveolar abscess, and great cellulitis; elevated temperature, fetid breath, and excessive flow of saliva, with corresponding constitutional depression. When amalgam had been used in a filling of this kind all these conditions were charged to the mercury in the amalgam, but *anything* that will hermetically seal a cavity containing septic material will, on true surgical principles, elevate the temperature, the same as an abscess without a drainage tube or any cavity in any part of the body containing septic material with no outlet.

Conscientious observers, highly regarded socially and professionally, give this testimony, with which I conclude:

Dr. Jarvie says, "I have practiced dentistry for thirty-five years, and have yet to see the first case where injurious results have attended the *intelligent* use of amalgam."

Messrs. John and Charles Tomes made practical experiments from 1861 to 1872 with filled teeth, and amalgam pellets, weighed with marvelous accuracy, placed in bottles containing saliva acidulated with nitric, acetic, citric, or hydrochloric acid, and kept in a water-bath inside another water-bath at a uniform temperature (blood heat) for a period of three months, in order to prove by analysis of the saliva whether or not amalgam fillings could be capable of producing mercurial ptyalism. The certificate was that the saliva contained no mercury in solution.

Dr. C. N. Peirce has said in regard to amalgam ptyalism that it is a thing of so rare occurrence that he believed the profession had never heard of but one practitioner who thought that *that* result was produced by amalgam; and he must have been the president of a large dental association in one of the Western cities, who when he was asked if he had ever heard of amalgam fillings causing nervous troubles, replied, "Yes, we have. It is not common, but some people are poisoned by mercury, as I can prove;" and then cited the case of a man in that city who was a nervous wreck, given up by several physicians. At last one doctor said he believed him to be suffering from mercurial poisoning, and upon examination found seven amalgam fillings in his teeth. "They were removed, and from that day the man began to improve, and is a strong, well man to-day, scarcely knowing what a nerve is."

Dr. J. H. McQuillen has said that in an experience of fourteen years he could not recall a single case of ptyalism, and his own experience had made him look with considerable doubt as to the value of their judgment or opinions as reliable diagnosticians upon those who assert that they have seen so many cases.

Dr. C. P. Fitch has said in regard to its toxical or injurious effects upon the system that "he was inclined to question, if not wholly doubt, any such influence, and had yet to see the first case of ptyalism due to the presence of mercury in the amalgam."

Dr. J. M. McGrath has testified for himself and his father, who had had an amalgam experience of ten or fifteen years, that as yet "they had never seen any bad effects resulting, such as had been ascribed to its use."

Dr. Flagg says, "It now remains for me to add my testimony of thirty years, with the assertion that during all my amalgam experience I have never seen one case of mercurial periostitis, mercurial ptyalism, mercurial necrosis, or the slightest symptom which could be ascribed to mercurial action. I have treated them experimentally with chlorate of potassium to demonstrate its utter impotency, and have then cured every case without the use of any anti-mercurials, and have left the teeth filled with amalgam. If anything more than this is required, I have it not to offer."

Discussion.

Dr. A. J. Volck said he had little to say on the subject of the paper, as the value of amalgam as a filling-material was well understood by all, and all were satisfied that it was impossible to trace to amalgam the ills that had been charged to it by some homeopathic physicians. As he had been represented as something of a link between the past and pre-historic times, he said he would tell them the story of his graduation. It was about forty-seven years ago he graduated from the Baltimore College. The exercises took place in a hall in Lexington street. The graduates were few,—about a dozen,—but the proceedings were very solemn. After a long prayer by the reverend gentleman who presided over the tabernacle of which Chapin A. Harris was a shining member, and a long speech by Dr. Bond, the graduates filed upon the platform and were each in turn presented by Dr. Harris with a sheepskin and each was told in turn that "*Qui palmam meruit ferat.*" It was the fashion to use a language at such an important occasion which not one in a hundred at that time could see the meaning of, and that is also the reason why there is so much poor Latin in the diploma itself.

Flowers were showered upon the class, not as now, handed up by the ushers, but thrown in the good old fashion, a little to the confusion of the dignified gentlemen who sat on the platform. Dr. C. O. Cone, a little man with great pomposity, rose and said, "Gentlemen, I want you now before this distinguished audience to give your sacred word of honor never in your practice to use amalgam. Please to answer yes," and all said "yes." He smiled and bowed, and the class smiled and bowed and returned to their seats. How many of this graduating class have kept that solemn promise he did not know. He stuck to it for a half-dozen years, and then—well, it was a question between honor and amalgam, and somehow honor went to the wall.

Many of the things said about amalgam by the essayist are farcical. If a man was suffering from mercurial poisoning caused from an amalgam filling he would not be cured of the condition, as one case was said to have been, in forty-eight hours after the filling was removed. If the mercury was absorbed in any case it was because there was too much mercury in the filling, because when properly prepared the mercury cannot separate from the amalgam; and if it was absorbed it could only be through the tooth and into the periosteum. In a dead tooth the mercury will sometimes, if there is an excess, pass into the tubules of the dentin. It could not be absorbed through the pulp, for it would kill the pulp immediately. Three hundred and sixty-five thousand five hundred and forty-four teeth he had filled with amalgam, and not one has done any harm.

Dr. W. A. Mills had been questioning homeopathic physicians about these stories of amalgam fillings affecting the health of those who had them, and none of those he had talked to about it believed in the possibility of such a thing. One had heard of a case of mercurial poisoning from a rubber plate, but not from fillings. One case where the physician in attendance ascribed severe stomach trouble to amalgam fillings and ordered the fillings removed did not improve after the substitution of gold for amalgam, and afterward died of cancer of the stomach; so it was not amalgam at all. He believed that poisoning did occur from rubber plates which were made of cheap rubber containing impure coloring matter. Some of the cheap rubbers contain lead, chrome, and bismuth, any of which might cause trouble.

Dr. B. Holly Smith said that Dr. Grady's case reminded him of the case of a woman who went to sleep with false teeth in her mouth. She waked up and they were gone. Having made a search for them unsuccessfully, she called the family and began to feel terrible pain and distress. The family not being able to find the teeth sent for a doctor, who did what he could to comfort her, but failed to locate the cause of her distress. The teeth, however, were presently found under the bed, and her pain and distress left her, and she was well immediately. He thought that the distress and illness caused by amalgam fillings were wholly imaginary, and of course the removal of the fillings would cure such cases. He, however, did have a homeopathic physician who brought his son to his office to have some fillings, and instructed him not to put amalgam in any of the teeth for fear they would harm the boy. He believed such theories were growing more prevalent in the country.

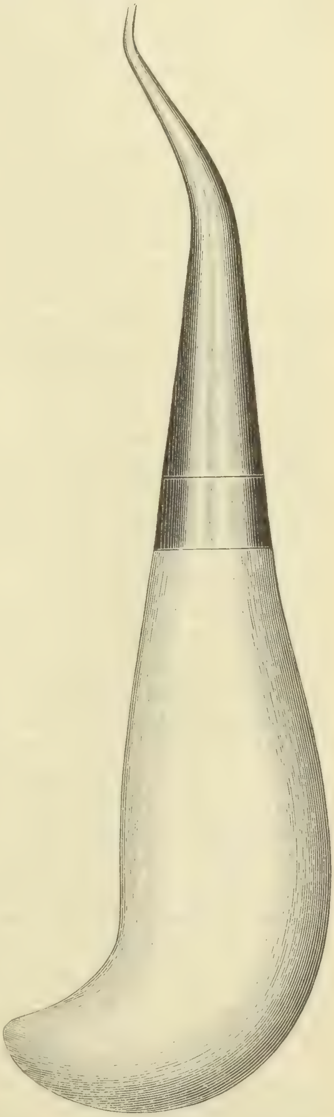
Some years ago some one advocated the use of nitrate of silver in cavities before filling. He had used it and filled the cavity with amalgam. Some weeks afterward the patient returned to him, and he found the amalgam as soft as cheese. It was because of the nitrate of silver, which prevented the crystallization of the amalgam.

Dr. A. W. Sweeny, Washington, said he was interested in anything bearing on the subject of ill effects from the use of amalgam; not because he wanted to find these ill effects, but because he was more and more addicted to the use of amalgam as the years went on. Only the day before he was speaking to a class on the subject and told them of this meeting, promising if anything on the subject was brought up he would save it and give it to the class on his return. He had often tried to learn of a single case where amalgam fillings had caused disease of any kind, but unsuccessfully. If the mercury escaped from the amalgam it would be in the state of metallic mercury, which is probably entirely harmless, and can be taken into the stomach in considerable quantity without evil results.

The discussion ended, and the meeting then adjourned.

Report of Clinics.

Dr. Wm. A. Mills demonstrated the old-fashioned way of filling a tooth with non-cohesive gold; finished in six minutes. The cavity was situated in the two lower molars, right side. The filling required about one and one-half sheets of Abbey's No. 6 foil. No dam was used, but instead thereof the parotid ducts were closed with spunk, while pressure upon the tongue with thumb was used to close the sublingual ducts. The gold was packed with old-fashioned instruments, some of which were at least seventy-five years old and almost worn smooth. Filling was made and polished with the same. The style of these pluggers is shown in the cut. The peculiar handle is worthy of attention, the size and shape being admirably adapted to the work of soft-gold filling by hand pressure.



The design of the operator was to show how a perfect gold filling was made in years gone by, and the means used to keep the cavity dry while operating. The filling was tested with a sharp-pointed excavator, and was found to have perfect margins and to be very dense.

Dr. GEO. V. MILHOLLAND brought a patient to demonstrate the strength of a porcelain tip. A youth of twelve years of age, with two broken central incisors which were restored with porcelain tips. In six months he returned with one of the tips in his hand. He had met with an accident. While drinking root-beer from a bottle his brother endeavored to get the bottle away from him, and in pulling it out of his mouth the neck of the bottle struck against one of the tips and knocked it out. Upon examination the tip was found to be unbroken, with the pins still remaining, but the root was broken and half-way up under the gums. The blow was severe enough to split the root, but did not break the tip. If porcelain tips are properly adjusted, taking in consideration the bite and the position in the mouth, they will last a long while and are as strong as a gold filling.

J. W. SMITH, D.D.S., dean of the Dental Department of the Baltimore College, demonstrated the method of taking an impression and bite in plaster of Paris without cup, for crown- and bridge-work. After adjusting the attachments to the roots, mix the plaster a little thicker than for an ordinary impression, take a smooth spatula and place the plaster around the attachments and spaces between the attachments and remaining teeth, if any, then have the patient close the mouth and bite into the plaster far enough to cover at least one-third the length of the occluding teeth. Pack the plaster on the labial surface with the finger and allow it to harden, then have the patient open the mouth and remove the impression. If it should fracture, stick it together with hard wax. Any attachment that should not come out with the impression can be removed from the roots and placed in its proper position in the impression, before running the model. If precaution be taken, this will be found to be a very accurate way of taking a correct impression and bite.

Dr. Harvey E. Kelsey presented an exhibit of dentures to substitute partial plates. Small dentures very similar to these have been illustrated and described, but there are two points in their construction to which he wished to call special attention.

1st. As he makes them there is no pressure allowed to come upon the soft tissue, the denture being sustained in position entirely by clasps and lugs upon the adjacent teeth. Exception to this, however, is made when the denture consists of more than two teeth, in which case there should be a small saddle plate extending not more than half an inch inside the ridge.

2d. The construction of the cuspid clasp. Thin platinum should be burnished around the cuspid, allowing it to pass as far as practicable between the cuspid and lateral on the palatal surface of the tooth and to show about as much as an average gold filling on the posterior labial surface. Care should be taken to burnish the metal very closely over the enamel protuberance, which is fairly prominent on the palatal surface of the cuspid just at or above the gum-margin. This inner part of the clasp should be about three-sixteenths of an inch wide. Remove the platinum and flow 18 k. or 20 k. solder over it till it is quite heavy. Such a clasp will snap into position and not only support mastication upon the denture to which it is attached, but require considerable force to bring it out. Clasps for the other teeth are made by burnishing platinum around them and flowing solder over it until stiff enough to withstand the lateral pressure in mastication. After the clasps are finished they should be replaced upon the model and a connecting box of heavy clasp metal soldered to them. At the same time the lugs to rest upon the molars or bicuspids should be soldered to the clasp. The skeleton of the denture is thus completed, and it may be placed on a new model (for the first one will be spoiled by the soldering) and teeth ground in and attached with rubber, or it may be finished up with porcelain facings, gold cusps, and solder, as in bridge-work. Dr. Kelsey preferred to do the work entirely on plaster models.

Dr. Clarence J. Grieves gave a clinic to demonstrate the easy removal of porcelain-faced collar or "Richmond" crown without mutilation or loss of post or band. With the porcelain in position, two holes are drilled at the palato-cervical aspect, where the solder unites with band, and the latter split and spread outward by forcing an excavator between the band and root. The cement attaching the crown to the root is cut away by passing a right-angled fissure-bur on each side of the post. A heavy instrument is placed in the aperture made and, with the root as a fixed point, pressure is exerted upward, forcing the crown downward till it is displaced.

With the porcelain missing, two drill-holes are made at the labio-cervical junction of porcelain and band, and the band split and separated as above. The cement is now removed anterior to and on each side of the post, and the crown is removed by pressure as above.

The advantages are that the post is left intact, the band retains its circumference and shape, and the entire piece is easily repaired.

Dr. A. C. Brewer made and inserted two porcelain fillings in the approximal surfaces of the upper left lateral and cuspid, using the Jenkins system.

Dr. F. F. Drew exhibited models of the following irregularity: Patient fourteen years of age. Cuspid in place of the lateral incisor. Lateral erupting inside of arch. Lower teeth closing over lateral. Treatment: Extracted first bicuspid; gold bands with hook attached were adapted to the cuspid, and first molar cemented to the two teeth and a rubber band stretched from hook to hook, drawing the cuspid back to the second bicuspid, after which a platinum cap was adapted to the first molar and a platinoid bar soldered to it extending to the cuspid on the opposite side, following the natural contour of the teeth, and lying snugly in contact with their buccal and labial surfaces. A hole was drilled in the bar directly opposite the lateral incisor to be drawn forward into place. A thin platinum band was next adjusted to the irregular lateral, to which was soldered, at the proper angle, a small German silver screw. This screw was then pushed through the hole made in the platinoid bar, and a small nut screwed on the whole appliance was then cemented to the first molar by means of the platinum cap and to the lateral by the platinum band. The patient was directed to turn the nut every day, which brought the proper tension on the lateral, and the tooth was gradually drawn into line. The time consumed was six months. The patient is now wearing a retaining appliance.

Dr. H. Phillips exhibited models demonstrating a method of taking impressions in cases of overlapping teeth where it is impossible to get a correct impression with modelling compound or plaster. A core of modelling compound is formed about the undercuts caused by shape and position of teeth, and a plaster impression is taken with compound in position about the teeth. After the impression is removed from the mouth, the modelling compound core is replaced in a plaster impression and a model is run.

Dr. J. C. Orrison demonstrated the practicability of inserting large cohesive gold fillings in the teeth of nervous individuals who protest against the employment of any percussive means whatsoever to condense the gold. The tooth operated upon was a left lower second bicuspid with mesio-occlusal cavity. Ivory points were used throughout for condensing the gold.

Dr. E. P. Beadles attempted to show that a dentist need never bend his back nor put himself in an uncomfortable position while operating. He said no man can do his best when in an unnatural position. The dentist can always maintain an upright posture by proper use of the mouth-mirror.

His experience is that the treatment of approximal surfaces in the anterior teeth is best done by removing the lingual wall, shaping the cavity with no retaining bits, this leaving parallel walls; starting with non-cohesive foil, which is burnished over the cervical margin, finishing with cohesive, using hand pressure throughout. By this plan little or no separation of the teeth is necessary.

To tip a porcelain facing with gold, after the tooth has been backed up, extend wax beyond the cutting-edge as far as the thickness of tip (to be put on); when the wax is removed fill the remaining groove with gold foil. In soldering (as usual), the foil will carry the solder beyond the end of facing, forming a perfect tip.

Dr. E. F. King gave a clinic on necrosis of the antrum and superior maxilla, modes of treatment, and appliances for retaining dentures, illustrated by models.

ANNUAL CONVENTION OF THE SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 1293, vol. xli.)

First Day—*Afternoon Session* (Continued).

Dr. J. H. Beebee, of Rochester, read the following paper:

Cements.

In presenting this paper to you I confess to a little fear of injured feeling on the part of some manufacturers, but I assure you and them that every process has been carefully and honestly conducted.

It may be different results would have been gained had another experimenter performed the work, but I know that I have endeavored to be as fair to one as to the other. I give you the result as I found it, not cutting or favoring any. Nor do I offer this as conclusive evidence of the inferiority or superiority of any make of cement. Conclusions I make not, leaving you free to exercise your own judgment.

When asked by the Rochester Dental Society to write a paper on cements, I found myself in profound ignorance. Of course, I had used this material from the commencement of my dental education; I knew that oxyphosphates were stronger than the then used oxychlorids, but that is all.

I had used the product of various manufacturers with the success of my professional brethren, had had my patience tried in common with others, etc.

I therefore started out into a new field, and at the present time am in that field,—perhaps a little farther in than when I started, but, as yet, I have not seen the rear fence, to say nothing of the other boundaries. I was hampered by not having any chemical laboratory or philosophical implements, save only those which may be found in an ordinary dental office. Articles had to be purchased and some appliances had to be made especially. I commenced by writing to various manufacturers of the best known cements for samples of their productions. The S. S. White Company responded with several varieties, some of which, being intended for bridge- and crown-work, were returned. As I confined myself to those which were intended for filling-material, other makes were discarded. Dr. Dawson sent some samples of cement in the state it comes from the fire. It may be of interest to those who wish to examine it.

FIG. 1.

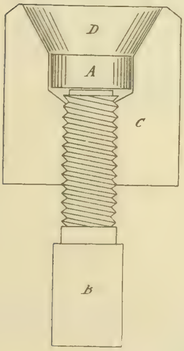
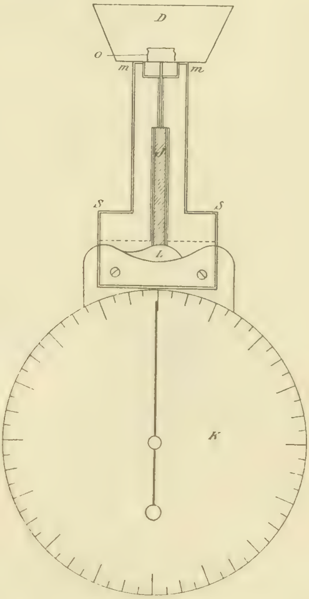


FIG. 2.



My first requirement was a matrix that would enable me to make fillings of uniform size and shape. A reference to diagram, Fig. 1, will enable you to understand its form. In this figure C represents a hardened steel matrix furnished with a plug A, also of hardened steel, and a screw B. The screw being lowered, the plug was placed in position and the filling made in the cavity D, which was filled a little more than full. While yet soft a plate of German silver was placed over it and pressure exerted by the jaws of a parallel vise forcing out the surplus around the edge of the matrix.

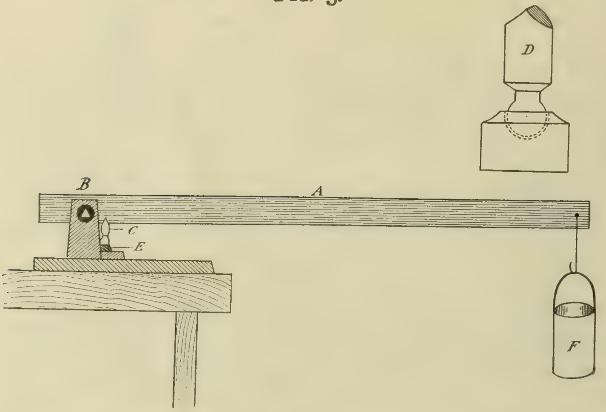
After the hardening process was complete, the surface was sand-papered even with the edge of the matrix by placing a piece of fine sand-paper on a metallic plate and rubbing the face of the matrix thereon. Then by forcing the plug by means of the screw the test was liberated. In mixing the cement the directions of the manufacturer were followed to the letter.

In making solubility tests a small piece of glass was placed upon the center of the "plug," and the ball of cement placed thereon and pressed into place, thus imbedding the glass even with the nether surface of the test. This piece of glass is shown at O in Fig. 2, D being the test. For the crushing test no glass was used.

The next instrument was a micrometer, Fig. 2. This consisted of an attachment to an optimeter or optician's lens, gauge K. A plunger J was fitted into a piece of metal that was attached to the optimeter. This plunger rested on the lug L, which actuates the pointer of the dial.

The point of the plunger was made to be even with the prongs or feet MM, and when the test, which had been subjected to this action of a solvent, was applied thereto, the glass resting on the plunger, the relative amount of abrasion that had taken place could be discerned. For the crushing test it was necessary to construct a dynamometer, which is shown in Fig. 3. It consists of a lever A, with a knife-edge fulcrum at B and a prop C, the top of which rested in a notch in the lever. It is seen enlarged, D.

FIG. 3.



This prop was composed of two pieces of steel forming a ball-and-socket joint, the better to give equal pressure on the test. The machine was screwed to the table and the test E placed on the support. The ball-and-socket prop being in place, a pail, F, was hung at the end of the lever. Into this pail shot were carefully poured until their weight crushed the test. As the leverage was about fifty-five to one, it will be seen that in some cases a force of twelve hundred pounds or more was exerted.

When the test crushed, the shot were weighed and their weight recorded. It is desired that you should understand that all of these tests are comparative, and do not give strains or measurements in actual standards. The porosity test was made by pinching a mass of cement between the thumbs and forefingers of both hands, forming a mass in the shape of a double wedge. Always after mixing, the slab was washed clean with hydrochloric acid and thoroughly dried before another make of material was used.

Let me say that a very nice way to remove cement from removed crowns and bridges is to boil them in a dilution of this acid.

The solvent tests were made in citric, lactic, acetic, hydrochloric, and oxalic acids and ammonia. The acids were used of such strength as to be quite sour to the taste, and not of a designated strength. Acetic, lactic, and oxalic acids had no perceptible action except upon the chlorids, which showed it in moderate degree.

In order of resistance in citric acid is the following table:

Artificial Enamel	¼
Caulk's	⅜
Gilbert's Vitroid	½
Weston's	1¼
Lithos	1¼
Dawson's Plastic	1½
C. N. Peirce	1½
Weston's Insoluble	1⅝
Ames's Metalloid	1⅞
Ivory's Plastic	2
Wilcox	2⅛
Harvard	2¼
Ash	2½
Welch's	2⅝
Baldwin's	3¾
Agate	4
Houghton's	4½

In the ammonia test I unfortunately forgot the tests and they were in longer than I intended, and were so wasted as to preclude the use of the micrometer, but not so far gone as to in any way vitiate the result. For placing them side by side, beginning with that least acted upon last, we have quite as satisfactory result.

The chlorids showed the least action. Houghton's was almost intact, while Agate, though disintegrated on its surface, stood well.

I give the following list of phosphates in the order of resistance:

Artificial Enamel.
Ivory's Plastic.
Dawson's.
Welch's.
Caulk's.
Ames's Metalloid.
Gilbert's Vitroid.
Lithos.
Harvard.
Peirce.
Xenolite.
Wilcox.
Baldwin's Hydraulic.
Ash.
Weston's Insoluble.

In the crushing test we have the following, beginning with the strongest:

	lbs.	oz.
Agate	24	11
C. Ash & Son	22	2
Houghton's	19	8
Ivory's	15	5
Dawson's	13	12
Welch's	13	6
Wilcox	12	
Weston's Insoluble	11	4
Ames's Metalloid	11	
Harvard	9	14
Lithos	9	14
Gilbert's	8	6
Peirce's	8	4
Weston's Xenolite	7	
Baldwin's Hydraulic	5	6
Caulk's	5	
Artificial Enamel	3	

The permeability test was the most difficult to determine, as it was to determine the ability of the various materials to resist encroachment of staining agents, and no measurements could be made save that of the eye only.

They were placed for a like period in red ink, removed, washed and dried, and then broken and compared.

I have arranged them in groups, beginning with the least stained:

Group 2. Houghton's, Agate, Ames, Caulk's, and Harvard.
Group 3. C. Ash & Son, Artificial Enamel, Lithos.
Group 4. Gilbert's Vitroid, Xenolite.
Group 5. Baldwin's Hydraulic, C. N. Peirce.
Group 6. Welch's, Ivory's, Weston's Insoluble.

After making the crushing test the material was carefully saved, and each make inclosed in a sealed envelope and sent to the chemical laboratory of Colgate University for a test for arsenic. They were numbered and not labeled. The following is the result:

No. 1. Houghton's Os Artificiel and No. 4 Agate contain arsenic. The process used was reduction in closed tube with carbon, and also solution and precipitation as sulfid in each case.

None of the others contained any traces of arsenic.

Conclusions.

You will probably be inclined to ask what conclusions can be drawn from these experiments. I leave you to form your own.

I once heard of a man who fancied that gold existed in the ground of his farm, and worked for years digging in search of that *ignis fatuus,* and after he had become tired of his labor some one asked him the result of his efforts. "Result! There ain't a gosh darned bit of gold on the whole dum place." We have cements and cements and cements galore, and there is not a "gosh darned one" that is fit for the purpose intended.

It seems to me that our chemists are experimenting on a wrong tack; they are striving to produce a material for filling teeth. Such material should be able to resist the action of acids and alkalies; should be impervious to liquids of any kind, and hard enough to resist the attrition of mastication, at least in a measure, and I do not believe this can be done by means of oxids and acids. The most important requisite I believe to be impermeability. Can this be gained a great stride will be made, and we will have none of the disgusting conditions noticed in removed crowns and bridges which we all know are not "whited," but golden sepulchres full of material worse than dead men's bones.

We need a substance that is primarily an insoluble fluid, or solid that will melt at a low temperature, that will be acted upon by some agent that will harden it.

All of our cements are composed of a powder that is acted upon by the fluid. The fluid should be the element that is acted upon by some agent, be it a powder or any other form.

I believe the desired result can only be reached by the use of oils or waxes or resins with a hardening agent, which will act much as do the oxidizing elements of paints or varnishes, or the action of sulfur on India-rubber in the process of vulcanization.

I believe that the coming cement will have for its base some thick, heavy hydrocarbon to be mixed with some substance which contains oxygen, bromin, or chlorin, which element will be given up to act upon the hydrocarbon.

In regard to manipulation of cement, I do not believe the majority of the profession are careful to mix the materials thickly enough. I know of no cement that is not better when used as thick and stiff as it can be made and placed in the cavity. Of course, this cannot always be done, but should be when practicable.

I have tried various forms of slabs for mixing, and I have found nothing yet that equals glass, but I think the form of spatula I use is worthy of consideration. It consists of a steel knife-blade thick on one side and coming to an edge on the other, the edge perfectly straight, and the back parallel to the edge except at the point where it rounds over to meet the edge, and the back of the blade a flat-surface manufacture, a perfect triangle in cross-section, and the whole hardened and not tempered. It is made very stiff and not flexible. This enables the operator to thoroughly mix the material and to gather it up from the surface of the slab, while the point enables him to pack the smallest space in crowns and bridges, and often even those in the mouth.

The meager results I present to you have not been gained without some labor. Often, the result of a week's labor in investigations of this kind can be expressed by a single figure; and though the work I have done has been a little arduous, I am glad that I have done it for this society, if by any means some or all of us can profit by it.

Discussion.

Dr. R. H. HOFHEINZ had intended to supplement this paper with the results of some microscopic tests which he expected to have made, but which had been impossible because of press of other matters on his attention. At some future time he would take it up and report to the society. The originality of Dr. Beebee's work commended it, though Dr. Wedelstaedt has made similar experiments with slightly different instruments. He was surprised that tests with lactic acid had not been more thorough, as we all know that lactic acid predominates in the mouth, and principally affects not only the tooth-enamel, but the cements we use to fill cavities, and in connection with porcelain fillings. He would also like to know if any experiments had been undertaken with the view of determining the expansion and contraction of cements. [Dr. Beebee said he had not experimented in that direction.] Dr. Wedelstaedt had determined that many cements either expand or contract, and also that usually cements will crush very much less readily after a few days than they will a few hours after they are mixed. We are shown by the work of Dr. Beebee and Dr. Wedelstaedt that we are using in our daily practice material of which we know almost nothing, and in some cases material utterly unfit for the purpose we try to make it serve. The manufacturers of cements for dental use are not furnishing us with the material pure and carefully prepared. Under the microscope you may find in the cement particles of wool, hair, glass, and other impurities.

Dr. W. W. BELCHER moved a vote of thanks to Dr. Beebee for the paper. It was original work in a fresh field important to the profession, and would command the attention of the profession when brought before it in the report of the society. The motion for a vote of thanks was put and passed unanimously.

Dr. W. S. ARNOLD, Rochester, said that to denounce cements as worthless was not fair. The material, as all know, is doing good service in a temporary way, and we are glad to have it. The manufacturers, too, are doing the best they can to furnish the best possible cement.

Dr. BEEBEE said that while we all recognized the fact that flint arrow-heads were serviceable weapons in the hands of savages, they were not the perfected Mauser bullet needed in civilized warfare of to-day. We have what is pretty good for some purposes in cements now, but we want the ideal filling-material which will be better in every particular.

Dr. C. H. NICHOLSON thought some of the cements used in Germany were superior to those made in this country. The fact that some cement fillings had come to his notice which were inserted in Germany twelve years before had prompted him to write to Dr. Hofheinz, who was then in Germany, to learn something of the cements used there, but he had not succeeded in getting anything more satisfactory than we have here. It is a serious thing for a dentist to use a material for filling that he knows so little of, and Dr. Beebee well deserves the thanks of the profession for the trouble he has taken in preparing this paper. With the advent of the porcelain filling we may get away from cements to a certain extent, but we will need especially good cements to fasten in the porcelain fillings.

Dr. F. W. MESSERSCHMIDT said he knew of cement fillings which Dr. Hofheinz had inserted sixteen years ago which were yet in good condition. This proves the lasting qualities of some of our cements. He thought that it was poor practice to sand-paper the surface of a cement filling. The cement naturally sets with a surface that is glossy and harder than the body of the mass. To remove this leaves the filling more subject to attrition and to solution by the fluids of the mouth.

Dr. HOFHEINZ said that prominent dentists in Europe did not consider cements more durable than we find them in America, though his own observations made him incline to the contrary opinion.

As to the use of oxyphosphates for the purpose of obtunding dentin, he recently had to remove two gold fillings from the mouth of a lady who was one of the most sensitive patients he ever had, but the teeth were found not at all sensitive. He put in oxyphosphate fillings, and instructed the patient to return in a few weeks to have the permanent fillings inserted. She did not return for several months. Upon removing the cement fillings the dentin was found to be so sensitive that he could hardly do anything with the teeth. This shows that in this instance at least the oxyphosphate had no power as an obtunder.

Dr. BEEBEE said we all know that glacial phosphoric acid is an irritant, and it is reasonable to suppose it would make the dentin sensitive.

Dr. FRANK FRENCH, Rochester, had used oxyphosphate fillings to obtund sensitive dentin. His method is to insert it stiff as possible, and let it harden for half an hour before removing the rubber dam. Had used it for years, and sees no reason to change his practice.

Dr. HOFHEINZ said he thought the reason his case failed was owing to the permeability of the cement. Expecting to remove it in a few days, he had mixed it much less carefully than he would have done if it was to remain.

Dr. BEEBEE thought that a varnish of Canada balsam in deep-seated and sensitive cavities would prevent the cement from causing sensitiveness. He had suggested the use of copal in ether for this purpose. Copal is a fossil gum much harder than Canada balsam, which will not dissolve in alcohol.

He wished some one else would take up the study of cements for the benefit of the profession. The work is important, and it is interesting, but it requires a good deal of time and patience. He hoped that others would work at it, as they would work with different means and in different ways, and the results gained would correct or certify those he had reported.

The subject was passed, and the convention adjourned to meet at 8 P.M.

Evening Session.

Dr. W. C. BARRETT, of Buffalo, gave a lecture, copiously illustrated by means of the stereopticon, upon "The Embryological Development of the Dental Tissues;" also a series of slides showing the appearance of syphilitic cases.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

THE thirty-first annual meeting of the Pennsylvania State Dental Society was held at the Neversink Mountain Hotel, Reading, Pa., July 11, 12, and 13, 1899.

The president, Dr. Thomas C. Stellwagen, of Philadelphia, called the meeting to order at 11 A.M., which was opened with prayer by Rev. Wm. P. Orrick, D.D., of Reading.

After a report by the Board of Censors, the president introduced Honorable JAMES N. ERMENTROUT, of Reading, who delivered an address of welcome, which was responded to by the president of the society. Dr. W. H. Scholl, of Reading, then delivered an address of fraternal greeting on behalf of the Lebanon Valley Dental Association and the Reading Dental Society, in which he recounted the steps which led to the formation of the State Society of Lancaster in co-operation with the Lebanon Valley Dental Association in that movement. He called attention to the progress which had been made during the thirty years of the existence of the state society; not only inside the professional ranks, but especially the growing importance which the public at large attach to dental services. He made an eloquent appeal for the preservation of high ethical standards in dentistry, and concluded by extending a cordial and hospitable greeting to all in attendance. At the close of his address, Dr. Scholl presented to the society a gavel made from wood grown upon Mount Penn, the present place of meeting, and a spot historically interesting as the location of some twelve hundred Hessians captured by the armies of Washington during the Revolutionary period. The president accepted the gavel on behalf of the society in a few appropriate remarks, and then read his annual address, which concluded the morning session.

Afternoon Session.

After the transaction of the usual routine business, Dr. WALTER H. NEALL, of Philadelphia, read a paper entitled "A Profession or a Business."* Before proceeding to the reading of his paper, Dr. Neall said, "Last winter when I was asked to prepare a paper to be read before this society, I thought of this subject. It has been on my mind for a number of years, and I have been collecting advertising cards, pamphlets, and such matter relating to dentistry. I have placed them for safe-keeping in a book which I call the 'Dentists' Yellow Book.' I wish to pass it around, so that it may be examined while I am reading the paper. It has most of the advertisements that one will find in Philadelphia. If you will examine it, I think you will catch the drift of the paper somewhat better."

Discussion.

Dr. YOUNG. I do not feel that I am at all prepared for the discussion of the paper, not having had an opportunity to investigate as thoroughly as Dr. Neall. While reading it two suggestions came to my mind as remedial which he did not make. First, he fell short in regard to the colleges. This is no slap at the colleges at all, but out in our section we happened to have a student whose case will illustrate my point very well. We knew of a young man who attempted to get a beneficiary certificate for a Baltimore college. We knew him to be with an advertising man. We knew his character to be such as would not be an ornament to our society, and we took the trouble as a local society to write to Baltimore, because we felt at the time and do feel ever since that our society was not properly treated, asking them not to grant him a beneficiary certificate and not to admit him as a student; that we did not consider him a young man worthy of entering our profession. After repeated communications from our society, no answer was received, and he was admitted and given his beneficiary certificate, and is now boasting that he has gotten into the college and will graduate and do all the advertising he pleases.

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* Printed in full at page 5 of the current number.

It seems to me that there is another point which Dr. Neall did not cover in his paper, and that is the man who comes and sits with us in our society; that is, the advertising man. Not the man whose card is in the book and never enters the society. It was suggested that it might be a wise thing to show in some of our lantern exhibits a few cards or some artistic fence advertisements; to put them on lantern slides and run them through for the benefit of those who are with us who are doing advertising, and see how it looks to them before this society.

Dr. NEALL. I really should like to hear more with regard to this subject. There is a man parading the streets of Philadelphia now, dressed in fantastic garb, and his face smeared with some sort of red paint, exhibiting his teeth as coming from a certain concern. Then there is another case, in which a woman went into one of these cheap workshops and wanted a two-dollar set of teeth. The attendant said, "You want something a little better than that." "No," she said, "I want that kind," putting two dollars down. He answered, "Go to that basket there and help yourself." And she did it, and went out satisfied. In another place a person bought a guaranteed set of teeth and plate to last ten years. She came back in two days and said, "I have broken off a tooth and brought it here for you to repair. You guaranteed to repair free of charge." "But we can't repair that free of charge." "But you said you would." "But, madam, you didn't break the plate; you broke the tooth off of the plate." And he took the money in that way.

I really think, as dentists, with the representative body we have here, we might be able to do something. I should like to hear more about it, if you care to take up the subject.

Dr. WILBUR F. LITCH. This is really an important question, and Dr. Neall's paper is strong, suggestive, and presents the facts of the case in a very forcible manner.

This is eminently an age of disillusions. We no longer believe that there is a pot of gold at the foot of the rainbow. But there is one illusion to which man still clings with desperate tenacity; that is that it is possible to get something for nothing, and that illusion is really at the basis of the success of all professional advertising, because its chief claim to public favor is cheapness; excellence is an entirely subordinate quality.

We know that the evil is great, and that it is one extremely difficult to remedy. One of the chief difficulties in the pathway of a reform of the abuse of advertising is public apathy and indifference in regard to professional advertising of any kind. In conversation only a very few days ago with a very intelligent gentleman, he expressed some surprise that there should be such a prejudice against physicians advertising, and stated that he could not see why it should be regarded as wrong. I suggested to him that he would hardly entertain an increased respect for his professional family adviser if he saw his name flaunted in large capital letters in a full-page or full-column advertisement in our daily newspapers. It is but a step in progress from the newspaper columns to the show-case and signboard, or to the grotesquely garbed fakir; because if any advertising of that character is permissible or legitimate all advertising is equally so, and the point at which the fakir shall stop is only determined by his own shamelessness.

Now, as to remedial measures, which is, of course, the important point in Dr. Neall's paper, we are very well satisfied, I think, that as the law is now constituted, so regardfully considerate of individual rights, it is quite impossible to expect anything remedial from that quarter. The people are too jealous of their prerogatives, as well as indifferent, as far as professional advertising is concerned. As the evil is one that affects ourselves, individually and as a profession, we must work out our own salvation, as is the case with most of the difficulties that concern us in this world. There is no use of appealing to Jupiter or to Hercules; we must put our own shoulder to the wheel. It is unquestionable that a good deal can be done by advancing the standard of educational requirement for admission to the dental profession. That, I think, will prove to be one of the most helpful measures that can be adopted. The standard of educational requirement is being, and will be, progressively advanced within reasonable limits. I am satisfied that the man who has sufficient intellectual force and character to acquire a good literary education and afterward to acquire a professional training is far less likely to throw himself away, to sacrifice his social and professional position, for the mere filthy lucre he may gain by resorting to charlatanism.

The colleges might take another step also, one which I have already suggested to this society. It is impossible as our profession is now organized to prevent a young man from taking any course he chooses in regard to advertising; but it is possible for the dental colleges to formulate a code of ethics and make each student subscribe thereto in the form of a written contract, which is always good in law, that upon judicial conviction of violation of that code, after repeated warnings, he shall be deprived of his diploma. If the contract was properly made it would probably stand in law. One dental college society in the city of Philadelphia last session modified its by-laws, so that now each member of the society is required to subscribe to the code of ethics of the Pennsylvania State Dental Society. That is a good example, which I would like to see followed by all college organizations.

In former times a graduate in medicine, before leaving his *Alma Mater,* in the presence of the assembled faculty, took what is called the Hippocratic Oath, based upon the ethical principles to which Hippocrates obligated his pupils. In America there is but one college, medical or dental, which still follows that custom, and that is the Dental Department of the University of Buffalo. In that institution a modified form of the Hippocratic Oath is subscribed to by each graduate on commencement day. It is, I think, a beautiful custom, and one which cannot fail to have a deterrent influence upon a man tempted to depart from obligations to which he has thus publicly pledged himself; surely he will think twice before he violates his pledge, mars his social standing in the community, and injures his professional brethren by such acts of charlatanism as those which Dr. Neall has so forcibly brought to our attention.

Dr. HENRY GERHART. A year ago at Ebensburg I rose so often to speak I made up my mind that at the next meeting my voice should not be heard; yet this discussion has taken such a turn that I felt I could not well keep silent. I was interested in the paper and in the manner in which the subject was handled, and I was very sorry that it seemed to fall flat. It is certainly a matter of great importance, not only to us, but also to the medical profession, that this character of "business" (for that is what it is) should in some way be arrested.

Dr. Litch tells us that one of the causes of these people succeeding so well is that human nature looks toward getting something for nothing. But there is still another element in human nature that has an influence in this matter, and that is the gullibility of human nature; as though men and women preferred to be gulled and to be humbugged rather than to be told the truth. Now, I have known men of profound learning; I have known college presidents, presidents of universities, men who had been students in medicine, to buy patent medicines and to use them in their own homes. And so it is with reference to dentistry. Not very long ago there came to my office, brought there by a friend, a cultured lady, an instructor. She made an engagement for two days, because she said she had so much to do. I made an appointment for an examination, and after going over the teeth very carefully, which were, indeed, in excellent condition, I said to her, "Madam, your teeth do not need anything." She became very much excited and said, "Why, that cannot be!" "Why?" I said; "why can't it be?" "Because," she said, "I was told in Philadelphia that my teeth needed thirteen fillings, and the dentist said I should come down and it would take an hour and a half and the charge would be twenty-five dollars." (It was not a cheap place.) Thinking it might be one of my distinguished friends in the city, I said, "What was his name?" "Oh," she said, "he didn't have his name up." "Why," I said, "madam, would you in a case of such importance as this go to a man you did not know without being recommended by some one who took you there? Did anybody recommend you to go there?" "No, nobody recommended me to go there." I asked her, "Would you, in a case of such importance as this, go to a man who had not even his name up and to whom your friends had not recommended you?" "Oh, well," she said, "he had an advertisement that all work done in his dental parlors was done without pain." "Well," I said, "madam, if any man with an engine like this could go and drill thirteen holes in your teeth and put gold in them, and do it in an hour and a half, you would be very much worse off than you are now." If it had not been that the lady who brought her to me had known me since she was born, or since she was able to know any one, that lady would have thought I was a poor, ignorant country dentist and didn't know my business, and that the city man knew what he was about,—and he did, too.

A good many years ago I read a book by Sir Henry Holland, the recollections of his life. A broader and more cultured man we have never seen. As you know, he was the Physician in Ordinary to the Queen. In that book he tells of the Prime Minister of England, who employed as his physician the most notoriously ignorant physician of the whole of England. When he was twitted about it he said, "I knew he knew so little about everything else that I thought he must know a great deal about medicine."

A few months ago I had the honor of being called upon to make a few remarks at the Dental Club in Philadelphia, and those who preceded me had spoken, first of all, of the importance of the dental schools insisting upon a preliminary education of a high standard; and another speaker had spoken of the importance of requiring that the man who is taken as a student in an office or college should be a man of natural ability to practice in the profession and a high degree of intellectual adaptation. I took the ground that, in addition to that, there should be insisted by all proprietors and faculties of dental colleges that those whom they receive as students should be men of culture and character, for, after all, character is the ground upon which we must build if we want to have a fair superstructure. And so I will say now in the furtherance of the purposes of that paper there are two things that we as a profession should do, and that is to impress upon those with whom we come in contact who are not of our profession the importance of selecting for their family dentist the man of whose personal character they have knowledge and whom they can trust. I think that the gentlemen who are connected with the dental schools of the land, before they receive any young man as a student or matriculant into their schools, should insist that they be men who have at the bottom a solid character; because no man whose character is wholesome and whose thoughts are honest and manly will resort to the various things that have been portrayed to us by this paper.

Dr. James Truman. The last word generally comes down upon the poor dental colleges. They are the ones who are made to bear the burden. My friend Dr. Gerhart seems to think it is possible for the colleges to examine the character of the young men who enter the schools. Now, in my opinion, we will always have degeneracy among us. It is just as impossible for colleges to understand exactly the character of the young men who enter these schools as it is for you, Mr. Chairman, or any other individual here, to judge of the character of the men here assembled. We are obliged to take these men upon the supposition that they have had a good preliminary education. Does that mean a good moral character? Not always, unfortunately. They go through the schools; they are graduated, and possibly have very little of what we understand of the ethical spirit. They go out into the world, and they are unable, after some effort perhaps, to make a living, and they enter into this advertising business. Now, of course we are all opposed to this general advertising business, but I may say here that before laws were established in the different states of this country we had all these so-called "parlor" establishments under other names. They were not as influential and did not do as much harm as they are doing to-day simply because there was no law behind them. As soon as the law was established in the several states, then they had young men graduates go in and act for them; and that gave a certain degree of confidence to the people in these establishments, and to-day they are doing a vast deal more harm than they ever did before the law was established. I do not condemn the law, but it is a fact and we must look at it as it is. The stream cannot rise higher than the fountain. These associations of ours are not setting the example, as I understand it, that they should set for these young men. We speak about the professional spirit. Are we a profession to-day? I hold that we have no right to call ourselves a profession, because we do not live up to the ethical code that we have established. Do we not in our conventions put up our proceedings to the highest bidder? Do we publish our own transactions or proceedings? Not a bit of it. We sell our proceedings, and we are thereby setting a very bad example to these young men who have just graduated. Now, gentlemen, let us purify ourselves before we undertake to take the mote out of the eye of our fellows. I am fully of the opinion that advertising in a small form is not detrimental. I don't blame a man having a country practice, for instance, who will put his card in the paper. I think it is perfectly justifiable for him to do so. I wouldn't do it, but he has to give some kind of notice to the public. We may decry that man; that sets him against us. Let us try by moral suasion, by ethical power, to build up our young men and encourage them and not always be bringing this everlasting law upon them.

Dr. C. R. Scholl. The point I was looking for in Dr. Neall's paper was this: that, since we have a trouble, as a remedy I think we should take in hand these men who have just been graduated. I think it is the duty of the society to more carefully look after them, meet them socially, and show them that we desire that they live as we profess to live, which membership in this august body implies.

Dr. Litch. I would like to make a disclaimer in regard to Dr. Truman's statement that he does not regard a simple card as illegitimate advertising. I heartily agree with him; such a card, simply giving name and address, takes the place in a country newspaper that a line or two in our city directories takes in urban life. It is customary and perfectly proper.

Dr. Neall. I have nothing further to offer in regard to the paper. To clinch my argument, or what I would consider s such, I would have you refer to the book that is going around the room, and it will show you to what an enormous extent this advertising business is being practiced.

I fully agree with Dr. Litch that the placing of an advertisement in a country newspaper is legitimate. I think it is not regarded as unprofessional, but I think it is a wrong thing for a man to advertise as some are advertising in that book; and I think it would be well to have a law against it, although Dr. Truman does not seem to enjoy it very much. But among the lawyers they have a code, I believe, that if a person advertises or does anything against the code, that person is brought up before a certain board and questioned, and if it is found that he is doing wrong his license is revoked. I don't know whether that could be done with regard to these dental parasites, as I call them. At any rate, they do it in that way. I have been discussing the subject with an eminent lawyer, and he says they are very careful about the code of ethics which they have, and if any one is doing anything illegitimate or publishing a lie he is dealt with severely.

(To be continued.)

OHIO STATE DENTAL SOCIETY.

FOLLOWING are the officers elected at the annual meeting of the Ohio State Dental Society, held in Columbus, December 5, 1899: L. L. Barber, Toledo, president; H. F. Harvey, Cleveland, first vice-president; Otto Arnold, Columbus, second vice-president; S. D. Ruggles, Portsmouth, secretary; Charles I. Keely, Hamilton, treasurer. S. D. RUGGLES, *Sec'y.*

EASTERN IOWA DENTAL SOCIETY.

THE annual meeting of this society was held in Iowa City on October 31, 1899. Following are the officers elected: I. S. Mahan, La Porte City, president; T. A. Gormly, Mt. Vernon, vice-president; J. B. Pherrin, Central City, secretary-treasurer.

J. B. PHERRIN, *Sec'y.*

LORAIN COUNTY DENTAL SOCIETY.

THIS society was organized about two years ago, and is in a healthy and prosperous condition, the meetings being well attended, and the papers and discussions interesting and profitable. It has been the means of bringing the members of the profession in that locality closer together, both socially and professionally. The officers are J. E. Burrell, Elyria, president; B. A. Purcell, North Amherst, vice-president; C. W. Purcell, Lorain, secretary and treasurer.

The next meeting, with the annual banquet, will be held at Elyria, Ohio, January 9, 1900. B. A. PURCELL, *Vice-President.*

SPRINGFIELD DENTAL CLUB.

THE Springfield Dental Club held its regular election of officers on Friday evening, November 24, 1899, in the Mercantile Club Rooms, Springfield, Ill. The following were elected: O. L. Frazee, president; E. F. Hazell, vice-president; George B. Crissman, secretary; Louis E. Wood, treasurer.

DENTAL SOCIETY ANNOUNCEMENTS.

NEW YORK ODONTOLOGICAL SOCIETY.

THE thirty-second anniversary of the above society will take place at the Academy of Medicine, Tuesday, January 16, 1900, at 2 and 8 P.M.

At the afternoon session, commencing at 2 o'clock, Dr. Joseph Head, of Philadelphia, will give a clinic,—Inserting a Porcelain Inlay,—using an entirely new cement. Immediately after the clinic Dr. Head will read a paper, subject, "Shadow Problems as Presented by Porcelain Inlays."

The evening paper, by A. W. Harlan, M.D., D.D.S., of Chicago. Subject, "A Review of Recent Literature on the Loose-Tooth or Pyorrhea Problem."

DR. W. W. WALKER, *Chairman*
58 West Fiftieth street;
DR. C. B. NASH,
DR. F. T. VAN WOERT,
Executive Committee.

ALUMNI ASSOCIATION, DENTAL DEPARTMENT UNIVERSITY OF BUFFALO.

THE Alumni Association, Dental Department University of Buffalo, desire to announce that "Alumni Day" will be held on Friday and Saturday, January 26 and 27, 1900, at the college building, No. 25 Goodrich street, Buffalo, N. Y. R. Ottolengui, M.D.S., will give thorough and practical clinics in porcelain filling, and will also deliver an address before the association. There will be other interesting clinics, and it is desired to make the meeting of value to every practitioner present. A general invitation is extended to dentists, and the program and further information may be obtained by addressing

J. W. BEACH, D.D.S.,
680 Main street, Buffalo, N. Y.

WISCONSIN STATE BOARD DENTAL EXAMINERS.

THE next meeting of this board for examination will be held at the Hotel Pfister, Milwaukee, on Tuesday, January 16, 1900, commencing at 9 A.M.

All examinations are conducted in writing in the English language. A practical demonstration of operative dentistry is also required, for which applicants will be required to furnish their own instruments and patients.

W. H. CARSON, *Secretary,*
609 Goldsmith Bldg.,
Milwaukee, Wis.

LOUISIANA STATE DENTAL SOCIETY.

THE Louisiana State Dental Society will hold its next annual meeting in New Orleans, La., February 23, 24, 1900. A cordial invitation is extended to all professional brethren to attend.

R. H. WELSH, *Secretary,*
625 Canal street, New Orleans, La.

EDITORIAL.

PROFESSIONAL IGNORANCE.

A LOCAL paper published at Cedarville, Ohio, gives an account of a case of supposed poisoning from the use of a gold alloy containing copper in the restoration of defective teeth.

The account states that "Dr. Lowery, the victim, died from copper poisoning from the gold fillings in his teeth. The gold was alloyed largely with copper. The work was done several years ago by Dr. Homan, a former dentist of this place. Dr. Lowery was compelled to give up his clothing store owing to his declining health, and thought that perhaps it would benefit him if he received more out-door exercise. He seemed to be losing his strength instead of gaining, and was taken to his bed some ten days ago, from which he never arose.

"At the request of his physician, the caps were taken from his teeth and examined by our resident dentist, Dr. Dixon, who found them as above stated. All that medical aid could do was done, but to no avail. He breathed his last on Wednesday evening at six o'clock.

"A post-mortem was held by Drs. Oglesby and Marsh, of this place, who found that his entire system was filled with poison from the copper. His stomach was found to be coated, as well as his liver. Some of the contents was sent to a Columbus chemist for analysis."

We learn from the practitioner who did the dental work in the case that early in 1892 he made two small gold crowns that would weigh not more than thirty grains each, which were constructed of 18 k. gold, the alloy being two parts copper to one of silver. The patient, Dr. Lowery, was himself a dentist, and dictated the grade of gold. No other alloy of copper was used in any way in his mouth. The total amount of copper in the two crowns did not exceed six grains.

To any one of average intelligence the idea that poisoning, either chronic or acute, could result from the use of copper under the circumstances noted will seem an absurdity. Even assuming that the whole six grains of copper contained in the crowns was absorbed into the system of the unfortunate patient, it must be quite evident that the process of absorption, extending over a period of seven years' time, would give ample opportunity for the elimination of the metal by natural processes; and when it is further considered that the crowns were intact when removed, it must be evident that but an infinitesimal portion, if any, of the copper was removed from the gold alloy of which the crowns were constructed.

The explanation of the remarkable diagnosis becomes clearer when we find by the report that the case was attended by a homeopathic physician, so that the whole proceeding may be relegated to the same category of lamentable ignorance which gives rise to the occasional, though not infrequent, accounts of mercurial salivation from amalgam fillings.

A case presenting certain analogies to the foregoing occurred in the practice of the writer. A lad of about fifteen years of age had been treated for an irregularity consisting of an anterior protrusion of the upper incisors. The defect had been quickly and satisfactorily corrected by a retraction band and molar anchorages. After the correction was completed he wore a removable retaining appliance consisting of a palatal plate of vulcanite, to which were anchored two T bars that passed between the incisors and held the teeth in position by contact of the cross-arms of the T bars with the labial surfaces of the teeth. The slight irritation due to movement of the teeth had wholly subsided; there was no soreness; the soft tissues were firm and healthy. About six weeks after the retainer had been placed in position the lad was seized with a convulsion in the school room. A neighboring homeopathic physician was called in, examined the patient's mouth, and promptly asserted that the retaining plate had set up the irritation which caused the convulsion. The case was later seen by the family physician, who was not a homeopath, and still later by Professor Garretson in consultation. Both of the latter disagreed with the diagnosis of the first physician as to the plate causing the nervous outbreak. Within two months the boy died of Bright's disease, which, in connection with the fact that the convulsive seizures were repeated with increasing frequency up to the time of his death, notwithstanding that the plate had not been worn since the first convulsion, was conclusive evidence that their cause was toxemic, due to uremic poisoning.

As an ignorant diagnosis of the character evinced in these cases may, and often does, lead to unpleasant medico-legal complications, the protection of the dental practitioner requires that the absurdity of such *ex cathedra* statements by unqualified, though licensed, practitioners of medicine should be generally recognized.

DENTAL SURGEONS IN THE ARMY AND NAVY.

THE committee appointed at the last meeting of the National Dental Association to secure legislation favoring the creation of a corps of dental surgeons in the army and navy have, after due consideration of all the interests involved, formulated a plan which has been embodied in a bill designated as H. R. 972, which on December 5, 1899, was introduced into the House of Representatives by Mr. Otey.

The full text of the bill is published elsewhere in this journal. It will be seen that the basis of the arrangement is that these shall be made as contract appointments under the terms and conditions applicable to army contract surgeons, and in the ratio of one dental surgeon to every one thousand of the army. It will be remembered that the basis of appointment asked for by the Hull bill at the last session of Congress was radically different, in that under the Hull bill it was proposed that dental surgeons should be commissioned officers.

The present effort to have dentists appointed as contract surgeons may, and in fact has already, aroused criticism from those who believe that the position of contract surgeon is one lacking in military dignity, and consequently one which will not demand the respect of the men in the service.

It would naturally be flattering to the attainments, if not to the vanity, of the dental profession to secure governmental recognition to the degree that the appointment of dentists as commissioned officers would imply, and there can be no doubt that intrinsically such a basis of appointment would carry with it more dignity and weight; but let it be remembered that the main ground upon which the plea for the appointment of dentists in the army service has been made by the dental profession is the humanitarian one of the desire to relieve the sufferings endured by those in the defensive service of the country by reason of their inability to secure dental services when needed. If the humanitarian motive is the real animating purpose of our demand we should be naturally content with the appointment of dental surgeons on a contract basis, for the reason that their rank in the service will in no wise affect the humanitarian character of the work, for which let us hope they are to be appointed.

Another reason why the efforts of the committee having charge of the bill should enlist the earnest support of every practitioner of dentistry in this country is that the appointment of dental surgeons, even on a contract basis, will practically test the value of dental service in the army and determine the extent of the need therefor. Should it be shown to the authorities that the need is a real one, and that the services rendered by dental surgeons in the army and navy are valuable and meritorious, there is good reason to believe that the present proposed arrangement will serve as an entering wedge by which better things, including higher dignity of rank, may be achieved.

Still another reason why the present movement should be supported is that the committee in charge of the matter have given the whole question the most careful consideration, are thoroughly conversant with the conditions to be met, and, above all, have a clear conception of just what it is reasonable to expect under existing circumstances; the Otey bill, H. R. 972, is the crystallized result of their deliberations. There is good ground for the belief that what is asked for in the bill alluded to can be obtained; more cannot, as was demonstrated by the defeat of the Hull bill, which aimed higher and failed of accomplishment.

It is suggested, then, without raising any question whatever as to the terms of the bill, that each public-spirited member of the profession write to his senators and representatives in Congress and secure from them an expression favorable to the passage of the measure in question. All letters written for the purpose should show an intelligent appreciation of the needs and rights of our soldiers with respect to the care of their teeth. The committee urge that "persons whose experience, observation, or special knowledge fit them to speak authoritatively, as, for instance, army surgeons, hospital stewards, army officers, enlisted men, medical men in private life, and the personally influential, should be urged to show their interest in the welfare of the army by writing to one or more of the members of Congress, and also to the Military Affairs Committe of the House and Senate, their indorsement of this bill." Concerted action is called for, and we trust that a united effort may be made to secure the passage of this measure, so important to all concerned.

DENTISTS AND THE TWELFTH CENSUS.

In the December, 1899, issue of this journal we called attention to the importance of securing a correct classification of dental practitioners so as to avoid the annoyance which was caused many of our profession at the time of taking the previous census, owing to the attempt of the superintendent, Hon. Robert P. Porter, to classify dentistry as a productive industry. With a view to determining the attitude of the director of the present census toward the matter in question, the editor of this journal addressed a communication to Dr. Williams Donnally, of Washington, requesting him to secure if possible an expression of opinion from Honorable W. R. Merrian thereon. Dr. Donnally promptly addressed a letter to the Director of the Census, which letter and the reply of the director are published here, as follows:

"November 26, 1899.

"Hon. William R. Merrian, Director of the Census, City.

"*Dear Sir,*—The director of the eleventh census attempted to establish a precedent in census classification by including the profession of dentistry as a productive industry and doctors of dental surgery as manufacturers. Later, at the hearing by the Senate Census Committee, June 27, 1892, on a proposed amendment to H. R. 7696 offered by Mr. Wilcox, March 29, 1892, he abandoned this position.

"As it is a question of considerable interest to my profession, I most respectfully ask whether or not it is your purpose to classify dentistry as a productive industry and require persons engaged in this specialty of the healing art to fill out and make return of the manufacturers' schedule?

"Very respectfully yours,
"Wms. Donnally,
"Doctor of Dental Surgery."

"Department of the Interior, Census Office,
"Washington, D. C., November 27, 1899.

"Dr. Williams Donnally,
"1022 Fourteenth street, Washington, D. C.

"*Dear Sir,*—In reply to your letter of the 26th instant, I have to say that it is not the purpose of this office, in collecting statistics for the Twelfth Census, to classify dentistry as a productive industry and to require persons engaged therein to fill out and make return of the manufacturers' schedule.

"Very respectfully,
"W. R. Merrian, *Director.*"

The reply of the director is specific, and may be taken as definitely and satisfactorily disposing of the subject.

DR. W. W. H. THACKSTON.

Dr. Thackston, the oldest graduate of dentistry in this country at the time of his death, died suddenly at his home in Farmville, Virginia, on December 8, 1899. An extended notice will appear in our next issue.

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OBITUARY.

DR. BENJAMIN H. CATCHING.

Dr. B. H. Catching died suddenly of apoplexy at his home, 357 Capitol avenue, Atlanta, Ga., at seven o'clock on the morning of November 23, 1899, as he was preparing to leave for his office. The stroke which caused his death came suddenly and without warning, and in fifteen minutes he was dead. Though he had not been in robust health for several years, caused by overwork and nervous exhaustion, he was apparently well up to the time of the first intimation of the fatal stroke, and had attended a church wedding in the city on the previous evening.

Dr. Catching was born at Georgetown, Miss., June 28, 1848, and was, therefore, at the time of his death about fifty-one years of age. He was a great-grandson of the famous Benjamin Catching, of Georgia, who was a delegate to the original Constitutional Convention.

He began the study of dentistry in the office of Dr. J. S. Knapp, of New Orleans, La., and graduated from the Baltimore Dental College, Baltimore, Md., in March, 1870, as valedictorian of his class. His professional career was commenced in Canton, Miss., where he located in the autumn of 1871, and where he practiced until 1881, when he moved to Atlanta, Ga., where he remained until the time of his death.

Dr. Catching was one of the most prominent men in his profession in the South. In addition to his large practice, he devoted a great deal of his time to literary pursuits, and through his writings he was known nearly throughout the professional world. He founded the *Southern Dental Journal*, which was during the eight years he edited it one of the leading monthly magazines in the United States. Upon retiring from the editorship of this journal, he commenced the publication of "Catching's Compendium of Practical Dentistry," which had a world-wide circulation. He continued to issue this valuable little volume for five consecutive years, or until 1896, when his health broke down from overwork and he was obliged to discontinue the publication, to take a much needed rest. During the next two years he did no special literary work other than writing an occasional article for some of the leading magazines. After a lapse of two years he found the desire for literary work returning, and he determined to again enter the editorial field, and accordingly in 1897 he established the *American Dental Weekly*, one of the first weekly dental publications in the world, which with the assistance of five co-workers he edited and published for one year with great success from a literary standpoint, but, on account of the enormous amount of work involved, it was abandoned after fifty-two consecutive numbers had been issued.

For several years prior to his death he had been working quietly on a book, making notes for reference and preparing data, which, had he lived to write it, would have been a very popular book in the South. It was to have portrayed Southern home life during the late civil war, the difficulties met and overcome in those trying times.

Dr. Catching was an enthusiastic worker in the leading dental societies of the country. He was a member of the old American Dental Association, which was afterward merged into the National Dental Association, and in which he frequently read papers and served on important committees. He was an ex-president of the old Southern Dental Association, which was afterward merged into the Southern Branch of the National. He was a member of the Georgia State Dental Society, and served four years as a member of the Board of Dental Examiners of Georgia.

In addition to his many other excellent traits of character, Dr. Catching was a great religious worker. He was an active, consecrated, working member of the Methodist Church, and was for many years the superintendent of a thriving Sunday-school.

Dr. Catching was a moral, Christian gentleman, a devoted husband, and a kind father. He was married June 15, 1870, to Miss Mattie Sanders, of Georgetown, Miss., who with one grown son and three younger daughters survive him. To these we tender our sincere sympathy.

While it does not lessen the shock and pain of parting, yet it is a comforting thought to know that though it came suddenly and without warning, he was prepared to go, because he had always lived a correct life, and that his many deeds of usefulness will live as a monument to his memory in the hearts of his fellow-men. H. H. J.

DR. STEPHEN T. BEALE.

Stephen Thomas Beale, M.D., D.D.S., the oldest practitioner of dentistry in the city of Philadelphia, and one of the oldest graduates of the Jefferson Medical College, died at his home, Tulpehocken street, Germantown, Tuesday evening, December 12, 1899, in his eighty-sixth year. His death was due to senile debility, though he retained all his faculties up to the last.

He was born in Sussex, England, May 23, 1814, and came with his parents to America in 1831, the family settling in Albany, N. Y. Dr. Beale obtained his early education in England; he also attended the Albany Academy. Later he studied dentistry with Dr. McCallister, of that place.

In 1837 he came to Philadelphia, and attended lectures at the University of Pennsylvania and at Jefferson Medical College, taking up the study of both medicine and dentistry. He matriculated at the Jefferson College with Professor James Bryan as medical preceptor, and Dr. Lee as dental preceptor, and graduated from Jefferson College in 1847, with the degree of M.D., and from that time until 1851 he practiced both medicine and dentistry, having begun the practice of the latter profession in 1840. The work of both professions, however, being too laborious, he later devoted himself wholly to dentistry.

His dental practice covered a period of fifty-two years in Philadelphia, when he retired after a successful and lucrative professional career.

He was known, with the late Dr. Ely Parry and Dr. John DeHaven White, as one of the "Fathers of Dentistry" in the city of Philadelphia, and with them was one of the founders of the "Pennsylvania Association of Dental Surgeons," which was the first movement in that city for the promotion of scientific dental education. He was the first vice-president upon its formation, and was the last survivor of its founders. Upon the fiftieth anniversary of the association, Dr. James Truman, dean of the Dental School of the University of Pennsylvania, who presided, "referred to the period, fifty years ago, as one of transition in the history of dentistry and the beginning of a new era in the study of science. He eulogized the founders of the organization, and said they never anticipated the number of dental colleges which would be established in the city."

Dr. Beale was also instrumental in obtaining a charter for the "Philadelphia College of Dental Surgeons," and on its formation was asked to fill two of its chairs, but he was prevented from doing so by ill health. This college in 1853 conferred upon him the honorary degree of Doctor of Dental Surgery.

Dr. Beale was a master of his profession, and was interested in investigating and undertaking such cases as, in those days, were considered extreme; as the repair of fractured maxillæ and the mechanical treatment of cleft palate.

In his younger days his laboratory was fully furnished with all implements and utensils for the making of artificial teeth; carving entire and sectional blocks and single teeth; also for the smelting and refining of precious metals. For years this laboratory was thrown open to young students, and was well attended.

He was a man of broad views, advanced ideas, bright intellect, and great energy; an old-school gentleman of courteous manners, kindly heart, and domestic propensities; a thorough Latin scholar, a lover of nature and of the fine arts. He contributed to both dental and literary magazines, and has published poems and other articles of merit, also many musical compositions. His active brain sought recreation in music, which he thoroughly understood and enjoyed.

From his youth he was a consistent, active member of the Presbyterian faith, having for the last thirty years been connected with the Second Presbyterian Church of Germantown. In early life he married Miss Louise Boggs McCord, who died twelve years ago. They had a family of seven sons and three daughters, all of whom with one exception survive.

Two sons followed their father in the dental profession, Dr. Stephen T. Beale, Jr., and Dr. Alonzo P. Beale. The latter died January 4, 1893.

RESOLUTIONS ON DEATH OF DR. BONWILL.

FOLLOWING is the report of a committee appointed by the Academy of Stomatology of Philadelphia to draw up resolutions on the death of Dr. Bonwill:

WHEREAS, W. G. A. Bonwill, D.D.S., a member of the Academy of Stomatology, has been removed by death, it becomes our mournful pleasure to make record of his worth; therefore be it

Resolved, As the sense of this society, that in the death of Dr. Bonwill the academy has lost a distinguished member and the dental profession one of its best known followers.

As a man Dr. Bonwill was genial and affable, though often misunderstood. As a dentist he was skillful and conscientious. As an inventor he had no superior in the dental profession. As an enthusiastic worker in the field of dental advancement he had few equals.

Entering upon the study of dentistry at an early age and under pecuniary disadvantages, he worked his way to success and eminence by burning zeal and untiring industry. His temperament was such that he could not be idle, and while others slept he was awake and working out problems which have made his name famous throughout the dental world.

As fellow-comrades, marching to the eternal world, we shall miss Dr. Bonwill from our ranks. Let us therefore loiter for a moment on the busy highway of life to place one garland on his tomb.

Resolved, That a copy of these resolutions be engrossed upon the records of the academy, and additional copies be sent to his family and the dental journals.

EDWIN T. DARBY, *Chairman,*
JAMES TRUMAN,
I. N. BROOMELL,
HARRY B. HICKMAN, *Secretary.*
Committee.

A meeting of American graduates resident in New South Wales was held at the offices of Dr. E. R. Magnus, Liverpool street, Sydney, on November 20, 1899, to express their feeling of esteem in which the late Dr. Bonwill was held among them.

Dr. Alfred Burne occupied the chair, and among those present were Dr. E. Randolph Magnus, Dr. Frank Magnus, Dr. Carter, Dr. Arthur Cox, Dr. Oscar Davis, Dr. Hinder, Dr. Stanley Rea, Dr. Nathan, Dr. MacTaggart, and others. Apologies were received from many unable to attend, owing to distance and short notice of meeting.

The following resolution was put and carried unanimously:

"That we, American graduates resident in New South Wales, desire to place on record our feeling of the great loss sustained by the dental profession through the untimely death of Dr. W. G. A. Bonwill, whose good work will long live on to testify to his great ability, and his name will ever remain a landmark in the history of dentistry. We also desire to express our deep sympathy with those members of his family who are left to mourn their loss."

Dr. Burne, in feeling words, spoke of the many acts of kindness shown him by the late Dr. Bonwill, and also of the great loss that dentistry had suffered in losing such a skillful dentist, and, in conjunction with the late Dr. Garretson, two of the most brilliant lights in the dental world. He felt that every graduate must well remember the clinics given by the late doctor, which (speaking personally) remained ever green in his memory.

Dr. Hinder in moving the resolution was unable to express his sorrow in fitting terms for the great loss sustained. Dr. Nathan seconded the resolution. Dr. Arthur Cox, Dr. Stanley Rea, and Dr. E. R. Magnus also spoke of the many personal acts of kindness received from the doctor. A vote of thanks to the chairman closed the meeting. H. TAYLOR, *Hon. Sec.*

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DENTAL LEGISLATION.

APPOINTMENT OF DENTAL SURGEONS IN THE ARMY.

FOLLOWING is the text of a bill introduced in the House of Representatives by Mr. Otey, December 5, 1899, which was referred to the Committee on Military Affairs and ordered to be printed.

A BILL to provide for the appointment of dental surgeons for service in the United States Army.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Surgeon-General of the Army, with the approval of the Secretary of War, be, and he is hereby, authorized to employ and appoint dental surgeons to serve the officers and enlisted men of the Regular and Volunteer Army in the proportion of one dental surgeon to every one thousand of said Army. Said dental surgeons shall be employed as contract dental surgeons, under the terms and conditions applicable to army contract surgeons, and shall be graduates of standard medical or dental colleges, trained in the several branches of dentistry, of good moral and professional character, and shall pass a satisfactory professional examination: *Provided,* That three of the number of dental surgeons to be employed shall be first appointed by the Surgeon-General, with the approval of the Secretary of War, with reference to their fitness for assignment, under the direction of the Surgeon-General, to the special service of conducting the examinations and supervising the operations of the others, and for such special service an extra compensation of sixty dollars a month shall be allowed: *Provided further,* That dental college graduates now employed in the Hospital Corps, who have been detailed for a period of not less than twelve months to render dental service to the Army and who are shown by the reports of their superior officers to have rendered such service satisfactorily, may be appointed contract dental surgeons without examination.

PERISCOPE.

MICRO-ORGANISMS OF THE MOUTH OF THE NEW-BORN.—Giuseppe Campo (*Pediatria,* Naples, vii, 229, August, 1899) has carried out a series of researches on the micro-organisms of the mouth of the new-born in order to ascertain (1) if the mouth at the moment of birth is free from germs; (2) the development of germs along with the establishment of the primary functions of life; and (3) the isolation of them and their pathogenic action. Reference is made to the work of Vignal, Biondi, Sanarelli, Freund, and Kreibohm, and the methods used are described. The contents of the mouth were taken at the moment of birth (the head of the infant being still on the perineum), four hours later when respiration had been going on, and twenty-four hours later when lactation had been commenced. Ten infants were examined at these three times, and twenty-one others were examined at one or other of the times named. Campo concludes that the mouth is sterile at the time of birth, for out of twenty-one cases in which the buccal contents were examined at the moment of birth, in six no germs were found; the fifteen cases in which organisms were found do not in his opinion invalidate the conclusion, for in some of these the contents were collected by the midwife in attendance, and in others it may be that germs gained entrance from the maternal vagina during labor. The effect of respiration was that the mouth immediately lost its asepticity, and sixteen observations made about four hours after birth demonstrated that the ordinary bacteria of the air find in the mouth a suitable soil, and multiply with great rapidity; they were the Bacillus mesentericus vulgatus, the Bacterium termo, and the Bacillus ulna. The first effect of lactation was found to be a diminution in the number of germs, possibly due to the mother's milk washing them downward into the gastro-intestinal tract; but its second effect seemed to be to increase the number of the kinds of germs met with. This effect Campo thinks is the result not of new varieties being introduced in the milk, for the milk direct from the breast is sterile, but of a power conferred by the milk upon the buccal contents of growing new kinds of germs. The organisms found were, in order of frequency, the Bacillus mesentericus vulgatus, the Bacterium termo, the Bacillus ulna, subtilis, leptothrix, and lineola (?), and three non-identified germs, to which the names of bacillus *x*, and coccus *y* and *z*, have been given. It was further discovered that none of these micro-organisms had any pathogenic properties, for intra-peritoneal injections of cultures of them into guinea-pigs did not produce any phenomena indicating virulence, save a slight diminution of the body weight. The characters of the non-identified germs and their cultures are fully described; bacillus *x* and coccus *z* caused passing loss in weight.—*British Med. Journal.*

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HINTS, QUERIES, AND COMMENTS.

COCAIN *vs.* ARSENIC IN PULP-EXTRACTION.—In a recent issue of the DENTAL COSMOS appears a well-written article upon the application of arsenious acid to destroy the pulp, in which the writer deals with the subject in a most masterly manner, presenting many points of practical information which are valuable whenever it becomes necessary to use this method of destroying the tooth-pulp. But is there not a better, a more scientific, way of accomplishing this? Arsenic has not been used in my practice more than a half-dozen times for the past three years; still I suppose I remove a fair average number of pulps, rarely ever resorting to capping, only in the young, under the most favorable conditions, then with the expectation of a large percentage of failures.

The use of cocain in my hands proved thoroughly satisfactory, both to patient and operator, and the method is so simple that it has only to be tried by the most doubting "Thomas" to be appreciated. Apply the dam, remove all *débris* and as much soft dentin as can be done without pain, sterilize the cavity in any way thought best. I use a solution of bicarbonate of soda: this destroys the acid reaction which will be found in all cavities of decay (easily proved by drying cavity and applying a piece of litmus paper moistened in pure water).

Now, search will invariably discover a point of actual exposure in some part of the cavity; this may be almost capillary in size, still giving direct access to the pulp. A small piece of spunk is moistened with pure water, distilled or boiled, warmed by holding over the lamp as one would anneal a piece of foil; dip it in cocain crystals; place it in the bottom of the cavity; upon this is placed a piece of soft rubber gum, large enough to well fill the cavity; with a piece of spunk, absorbent cotton, or bibulous paper, held in foil-carriers, press upon the rubber, making, as it were, a piston of it. Quick, gentle pressure is best; give it "the Chicago jerk," as used in hand-pressure fillings. An incredibly short time often suffices to thoroughly anesthetize the pulp in a three-rooted molar; no haste is necessary; take time, thoroughly expose, get as direct access to the roots as possible, and with a Donaldson broach No. 5 proceed to twist the pulp out, absolutely without pain; if, however, on trial the pulp is responsive repeat the application. At times the first application will only enable the attainment of thorough exposure, and consequently more rapid absorption of the cocain under pressure. Here there is no danger of systemic impress, such an infinitely small amount of the drug is absorbed, and this seems localized in the pulp. I sometimes use eucain B, but it does not seem as potent as cocain. When the pulp is removed proceed to check the hemorrhage; this sometimes requires a little patience. The time can be shortened by using gallic acid or a little tr. ferr. chlorid. upon cotton lint in the root, as one would a dressing, or wind a little cotton upon the point of a broach, arm this with a styptic, and pass into the canal and allow it to remain a few moments. I disapprove of the root-drier here; I find it does not check the bleeding or weeping from the apical region, and tends to a possible injury of the contents of the dentinal tubuli (I consider Evans's root-drier indispensable in freeing the roots of putrescent matter).

When hemorrhage is checked and the canal thoroughly dry, an infallible test for a dry canal is found by passing a smooth dressing probe into the canal. Upon withdrawing immediately wipe it across the dam; the least possible trace of moisture will show on the dam. Proceed to fill the root as thought best. I use chloro-percha and gutta-percha points. Finish the operation, or make a temporary filling in the cavity of decay, as most convenient. Thus we accomplish in one short sitting what used to take from two days to two weeks, leaving the tooth in an infinitely better condition than if arsenic had been used. No one can say just when or where the action of arsenic will stop. Not only does it destroy the pulp, but also the contents of the tubuli, often going to the cementum and its membrane. Do we not at times have teeth brought to us the roots of which have been well and comfortably filled for years, when without apparent cause they begin to give trouble? It might be said to be a non-septic inflammation, for upon removal of the root-filling all is found odorless. May it not be that here we have the firebrand of inflammation lit from a spark (arsenic) which has been smouldering, smouldering, but always creeping toward a point where it may burst forth in a brilliant flame of acute inflammation, or into a dull glow of low-grade inflammation?

It is needless to say, for all surgical success, instruments and surroundings must be aseptic.

Never insert in any root a broach or probe which is charged with the products of putrefaction, even in treating a tooth with two or more roots; the broach or probe should not be used from one to the other without being well cleaned.—R. C. YOUNG, D.D.S., Anniston, Ala.

PUBLISHER'S NOTICES.

THE DENTAL COSMOS FOR 1900.

THE commencement of the closing year of the century marks the entrance of the DENTAL COSMOS upon its forty-second annual volume. The forty-one volumes already published do not comprise the entire life of the magazine, which goes back for its beginning to the first number of the *Dental News Letter*, its immediate predecessor and progenitor, which appeared in October, 1847. The DENTAL COSMOS thus goes back to within eight years of the foundation of modern dentistry.

During all these years it has been the consistent and persistent advocate of the most progressive dentistry. It has been in every movement for the uplifting of dental science and art. It has chronicled every advance in scientific knowledge, every improvement in methods of practice. Its volumes are the completest record of the career of dentistry extant. It has witnessed and testified the growth of dentistry from the swaddling clothes of 1847 to the full stature of to-day, a recognized, honored profession.

Dentistry has not stopped growing. Every year it reaches out to broader fields, it occupies safer ground, its practice more and more leaves the empirical for the demonstrated, it matures its judgment, its science settles mooted questions. The DENTAL COSMOS is its faithful Achates, its armor-bearer, its support in every advance.

There is no movement in dentistry worth the knowing which is not told of in its pages. It is, in a word, the one magazine which the dentist whose heart is in his work cannot afford to be without.

There is no issue of the DENTAL COSMOS, we believe, which is not well worth the year's subscription price to the dentist who reads and puts its teachings into his practice. Its purpose is to help dentists to a better realization of their opportunities and their prerogatives. To the better fulfillment of that purpose it asks the support of every practitioner of dentistry, in the sure conviction that not only the great cause of dental progress will be forwarded, but that the individual will find his work made easier.

This issue of Vol. XLII is sent to all subscribers for Vol. XLI. Those who have not yet renewed will greatly oblige us by attending to the matter at once. They know from experience its value. We ask that they show their appreciation by renewing promptly.

To intending subscribers we promise a faithful record of the progress of dentistry during the year. We can do no more.

Subscription price to United States, Canada, Mexico, Puerto Rico, and Philippine Islands, $2.50 a year in advance; to other U. P. U. countries, $3.00 a year in advance. Half a year half price.

THE S. S. WHITE DENTAL MFG. CO., *Publisher.*

THE INTERNATIONAL TOOTH CROWN COMPANY VS. KYLE.

INTERPRETATION OF THE DECISION.

SINCE the recent decision in the International Tooth Crown Company's suit, we have received many letters and inquiries from dentists, in various parts of the country, asking for information respecting it.

These inquiries plainly indicate that there is a very general misunderstanding among the dentists as to the nature of the decision.

The idea appears to be prevalent among the profession that they, as individual dentists, are liable for work which they are now doing, and that the decision covers crowns of all sorts, including porcelain, as well as solid gold or cap crowns, whether used singly or in bridges.

As this wide-spread misconception affects the sale of certain articles made and sold by this Company, we have thought it proper to make a statement of facts. We therefore publish the following opinion of our counsel, Messrs. Fraley & Paul:

NO. 929 CHESTNUT STREET, PHILADELPHIA.

THE S. S. WHITE DENTAL MANUFACTURING COMPANY.

Gentlemen,—As requested by you, we have carefully examined the recent decision of the United States Circuit Court for the Southern District of New York, in the suit of the International Tooth Crown Company against James Orr Kyle. The patent sued upon is that of James E. Low, No. 238,940, of March 15, 1881, the claims of which are as follows:

"1. The herein described method of inserting and supporting artificial "teeth, which consists in attaching said artificial teeth to continuous bands "fitted and cemented to the adjoining permanent teeth, whereby said artificial "teeth are supported by said permanent teeth without dependence upon the "gum beneath.

"2. An artificial tooth cut away at the back, so as not to present any con-"tact with the gum, except along its front lower edge, and supported by rigid "attachment to one or more adjoining permanent teeth, substantially as and "for the purpose set forth."

Without attempting to discuss the patent at length, or to define what possible construction could be put upon the claims, we point out that it only covers dental *bridge-work*, and not single crowns, of themselves.

We think it proper to call attention to this point, because a person hastily reading the second claim might possibly think that it covered an artificial tooth cut away at the back, irrespective of its attachment to adjoining natural teeth. Such, however, is not the case, and it is perfectly clear that the Logan crowns and the Evans gold crowns, sold by your Company, are not in the least affected by the decision.

The patent expired on the 15th of March, 1898, and consequently no one can be held liable thereunder for bridge-work made since that date, nor can any injunction hereafter issue to restrain a dentist from using the invention set forth in the patent, as it is now public property. His utmost liability would be for bridge-work done during a period beginning six years before the day the suit was brought, and ending on the 15th of March, 1898. This can now only be recovered by a suit before a jury, as distinguished from the somewhat lengthy and expensive procedure in equity.

We have made this brief statement as to the liability of dentists for past use of the invention, as a matter of general interest, but so far as your own position is concerned two things are perfectly clear. *First,* that the Logan and other porcelain crowns, and the gold cap crowns, sold by you, are not of themselves, and never were, within the claims of the patent, since the latter only covered bridge-work; and, *Second,* that at the present time any one is free to use artificial teeth of various kinds for bridge-work, without liability under the Low patent above referred to.

FRALEY & PAUL.

December 12, 1899.

In publishing this statement we desire to say that we are in no manner interested in the bridge-work controversy, saving only as it may appear to affect any article or articles sold by us and used by dentists; and further, that we disclaim giving or intimating any opinion as to the merits of the case, as we do not feel that we are competent to do so.

THE S. S. WHITE DENTAL MANUFACTURING COMPANY.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING NOVEMBER, 1899.

Nov. 7.—No. 636,284, to James R. Osborne. Porcelain tooth-crown.
“ “ No. 636,285, to Benj. F. Pinson. Veterinary dental forceps.
“ “ No. 636,290, to Wm. I. Reynolds. Cuspidor.
“ “ No. 636,359, to Chas P. Schultz. Dental root-drill.
“ “ No. 636,367, to Albert P. Tschirner. Dental cement.
“ “ No. 636,462, to Kossuth W. Small. Dental bib.
“ “ No. 636,476, to Fredk. E. Webster. Dental hand-piece.
“ “ No. 636,568, to Lewis S. Seeley. Tooth-crown.
“ “ No. 636,571, to Gideon Sibley. Dental disk-holder.
“ *14.*—No. 637,123, to Addiel M. Jackson. Cooling attachment for dental impression trays.
“ *21.*—No. 637,303, to Ernest R. Tait. Creosoted charcoal points.
“ “ No. 637,338, to Thos. L. James. Dental hand-piece.
“ “ No. 637,480, to Herman D. Osgood. Dental impression cup.
“ “ No. 637,514, to Ira G. Leek. Powder-container top.
“ “ No. 637,522, to Francis A. McGinnis. Tooth-brush.
“ “ No. 637,680, to Daniel W. Tower. Brush.
“ *28.*—No. 637,970, to John E. Nyman. Dental saliva-ejector and tongue-depressor.
“ “ No. 638,019, to Henry D. Justi. Artificial tooth.
“ “ No. 638,197, to George T. Higgins. Dental chair.

SAINT APOLLONIA.

THE

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ORIGINAL COMMUNICATIONS.

THE ROENTGEN RAYS WITH ASSOCIATED PHENOMENA, AND THEIR APPLICATIONS IN DENTISTRY.

BY W. A. PRICE, D.D.S., CLEVELAND, OHIO.

(Lecture before the Ohio State Dental Society, December 5, 1899.)

MR. PRESIDENT, ladies, and members of the Ohio State Society, I thank you for this honor, of which I am entirely unworthy, of giving you a little talk on this most interesting subject, which must be very imperfectly covered in so short a time.

If we are to use Roentgen rays successfully and intelligently, we must familiarize ourselves as far as possible with the nature and characteristics of this wonderful force. This knowledge is not only desirable, but imperative. We can best do this by comparison with other similar forces with which we are familiar. Let us look for an analogy; some similar imperceptible transference of force or energy. You hear my voice, how? Sound is conveyed by a succession of waves. The pitch or tone is dependent on the rate. Let us recollect in passing that the sense of hearing makes us conscious of all vibrations in the atmosphere from sixteen to thirty-two thousand per second. But this energy requires an easily detected medium to travel upon; it cannot come to us through a vacuum. Another of our senses receives energy which we call light. This may vary in color. Again, we are receiving vibrations of varying rapidity, and the rate gives us the particular color. Note that this energy passes easily through a vacuum. We call them light waves.

Still another sense receives impressions without any trace of the medium that brings it,—namely, sensation of temperature, as we feel heat and cold or the absence of heat. This energy we know as heat waves, and it also passes through a vacuum.

So also a mysterious energy, imperceptible in itself, enters chemical compounds and entirely changes them. For example, bromid of silver in the photographic plate. This force we know as actinic waves. Equally mysterious and imperceptible is the force that moves the magnetic needle or marshals the iron filings, magnetic waves. All the latter pass through substance and through great space, even trillions and trillions of miles, without an atmosphere or an apparent conductor. We cannot imagine effect without cause, nor can we imagine energy being conveyed without something to convey it. Heat and light and magnetism coming from the sun or a distant star must have a means of passage.

This medium, according to modern science, is the everywhere existing ether. It extends throughout all space between all planets, penetrating and pervading among the atoms and molecules of all substances, as the air does through a carload of pumpkins. If we follow up this line of thought just a little farther, we will get a very comprehensive idea of what Roentgen rays probably are. When your ear receives two hundred and fifty-six vibrations per second, you recognize the tone of the middle C of the musical scale. And just so with every definite impression-rate of vibrations, you receive definite impressions.

Just as the different sounds are the result of definite vibrations in the atmosphere, just so are magnetism, heat, light, colors, photographic or photo-chemical effect, and X rays the result of definite vibrations or waves in the ether. Imagine waves in the ether having about such a motion and curve as the surface of water in a rolling sea. You can easily imagine various waves of the same shape flowing at the same rate,—viz, approximating one hundred and ninety-two thousand miles per second (Tyndall), though for each effect we call magnetism, heat, light, color, photo-chemical action, etc., there are different, though definite, lengths of waves, and hence numbers of waves per second. The variety is enormous; from waves over a million miles long for complete oscillation, as the magnetic waves from the sun (Oliver Lodge), which require six and a half seconds for a complete oscillation, to waves one-twenty-millionth of an inch long, Roentgen rays (Vollea), making two hundred and eighty-eight thousand trillion vibrations each second.

Intermediate between these we are able to recognize a large number of distinct wave lengths, though relatively few considering the wide range. The sense of sight recognizes only a short series of wave lengths less than one octave from one-thirty-nine-thousandth of an inch long, producing violet light. Practically all the ether waves that produce effect upon the human eye have lengths between these two boundaries.

The length of the ether waves determines entirely the color they produce by falling upon the retina of the eye. Time only permits of one example here. We will now have the professor at the lantern place a prism in front of the light, and you will see the distribution of the seven primary colors of the solar spectrum, or in this case the spectrum of the lantern light, though not so plainly as you would from an arc light. Without explanation, we note that ether waves of various lengths each have a different angle of refraction in passing through this prism, and in this way we are able to separate and select them. This is true also of those waves on each side of the visible spectrum. Kindly note that all waves longer than the infra-red or shorter than the ultra-violet do not appeal to the sense of vision, and to do so must have their wave lengths or periods changed to come between those limits above mentioned. This we do with the Roentgen rays by means of the fluoroscope. The wave lengths are changed in the crystals, which we will explain shortly.

To better understand the nature of the Roentgen rays, we will observe quickly some characteristics of some waves of other lengths. In the lower part of the visible spectrum, and extending down through four octaves of wave lengths, we have the heat waves. Our single experiment will suffice. I pass the waves from this arc light through this filter, made of carbon bisulfid holding iodin crystals in solution, and remove all the light rays, and then condense the remaining rays with this lens, and I am able to set this paper on fire or heat this platinum white hot. The relation of the light rays to the heat-producing rays can best be appreciated by this lantern view (Fig. 1), showing that the heat comes slightly from the lower part of the visible spectrum, but its major portion from waves of greater lengths. Fig. 2 shows the relation of the heat rays to the light rays from the sun after passing through the moisture of the atmosphere, and the next (Fig. 3) the relations of the heat rays of an electric arc to the light rays. You will observe that fully eight times as much of the energy of the arc light is given off in heat rays as in light rays. In the next (Fig. 4) we see the relation of many wave forms to each other and to sound waves.

The waves of longer period of length do not appeal directly to any of our senses, but we know that they exist from their effects. Marconi and many others have invented eyes to see, as it were, some of the waves of other lengths. That is the function of the receiver or coherer used in wireless telegraphy. I have here arranged a working model. When I set these brass balls of this induction coil about an eighth of an inch apart and cause a spark to jump across, it is probable that the vibrations produced in the surrounding ether are at the rate of about sixty millions per second, the waves being probably a few miles from crest to crest. You notice that as soon as I produce waves of this certain period this coherer receives them and closes the circuit of this battery, which I have arranged by means of a relay to ring a bell. To show you how little effect distance has, I will have some one carry it away through the building, behind walls, etc. [The model worked splendidly, responding each time the coil was excited.] By this means Marconi has signaled ninety miles.

In a similar way wireless telegraphing or signaling is done at a great distance by waves of still greater length,—magnetic waves, which we have not time to consider.

Ether waves of very short length, extending away above the visible spectrum into the so-called ultra-violet rays, including the Roentgen rays, have the power of producing extensive chemical changes. Chief of these are the actinic rays so important in photography. You see when I put this bottle of disulfate of quinin in the ultra-violet part of the spectrum it glows. It is probably from this power that we are able to get pictures with the Roentgen rays. We allow these invisible rays to penetrate the tissues to be examined, and some of the rays are arrested or stopped, according to the obstruction offered by the different parts of the field through which

Fig. 1.

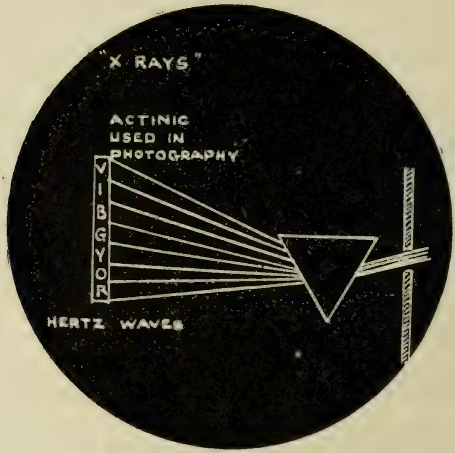


Fig. 2.

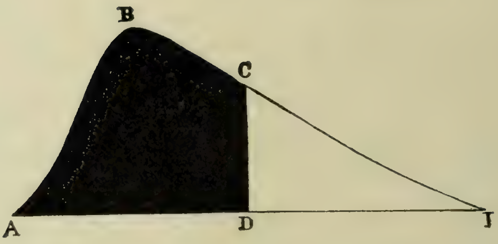
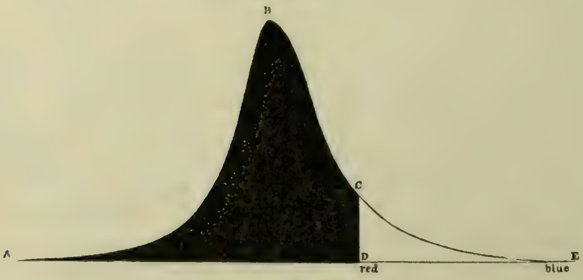


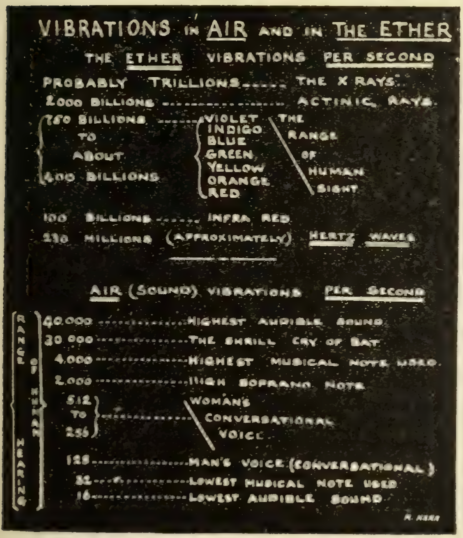
Fig. 3.



they pass, thus producing unequal chemical action; hence the term shadowgraph. This hypothesis of ether waves of extreme frequency explains very clearly and plainly practically all the phenomena of Roentgen rays. There is another theory; that of material particles being thrown off by the anti-cathode, which passes through the glass of the tube unobstructed. This theory is not so generally accepted.

Before considering the sources of Roentgen rays it would be proper to mention in this connection that the glow of certain insects and the fact that, beside their luminosity, they are able, through opaque substances, to produce effects upon photographic plates, and also this property of certain substances, as uranium salts, and the dark rays of certain lights, discovered by Le Bon, are due probably to ether waves of similar short length to the Roentgen rays.

FIG. 4.



VIBRATIONS IN AIR AND IN THE ETHER

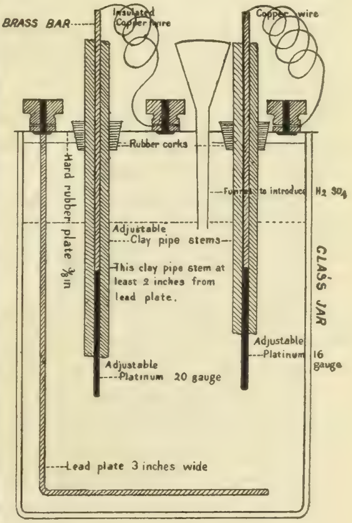
THE ETHER VIBRATIONS PER SECOND

PROBABLY TRILLIONS ...... THE X RAYS.
2000 BILLIONS .... ACTINIC RAYS.
750 BILLIONS TO ABOUT 400 BILLIONS ...... VIOLET INDIGO BLUE GREEN YELLOW ORANGE RED — THE RANGE OF HUMAN SIGHT
100 BILLIONS ...... INFRA RED
230 MILLIONS (APPROXIMATELY) HERTZ WAVES

AIR (SOUND) VIBRATIONS PER SECOND

RANGE OF HUMAN HEARING
40.000 .... HIGHEST AUDIBLE SOUND
30 000 .... THE SHRILL CRY OF BAT
4.000 .... HIGHEST MUSICAL NOTE USED
2.000 .... HIGH SOPRANO NOTE
512 TO 256 .... WOMAN'S CONVERSATIONAL VOICE
128 .... MAN'S VOICE (CONVERSATIONAL)
32 .... LOWEST MUSICAL NOTE USED
16 .... LOWEST AUDIBLE SOUND

FIG. 5.


BRASS BAR
Insulated Copper wire
Copper wire
Rubber corks
Hard rubber plate ⅜ in
Funnel to introduce H_2SO_4
Adjustable Clay pipe stems
This clay pipe stem at least 2 inches from lead plate.
Adjustable Platinum 20 gauge
Adjustable Platinum 16 gauge
GLASS JAR
Lead plate 3 inches wide

The practical source from which we derive these Roentgen rays is from the point of impact, opposite a concave cathode, when a current of electricity is discharged through a gas in a vacuum tube. Usually this point is a plain platinum surface, placed from forty-five to sixty degrees to the direction of the cathode rays. These tubes may be excited by the discharge from an induction coil or a static machine, or a Tesla coil or oscillator. As these devices have been quite fully described in current literature, we will not stop to review them in detail, except to note the nature of a discharge through air.

This induction coil, you will remember, consists of a primary coil of a few turns of coarse wire surrounded by a secondary coil of a very great number of turns of very fine wire. When an interrupted or alternating current is passed through the primary a current of very high voltage is induced in the secondary, demonstrating itself in disruptive discharges between the poles of the secondary. The phenomena are very beautiful in the dark, as you observe between these two suspended wires,—lightning on a very small scale. The resistance of the atmosphere is so great that it takes probably many hundred thousand volts to discharge across that distance. When I place the discharge points closer together you see we get a continuous flame. When this discharge takes place through a tube partially exhausted, the phenomena are very beautiful. I have here a nice assortment of these tubes, which I will now light up with the room darkened. You see both luminosity and fluorescence of the glass. At a certain degree of exhaustion the resistance to the passage of the current is very small. When I connect a lot of these Geissler tubes in series you note, besides the gorgeous display in which the current has to pass through, many yards do not offer as much resistance as a half-inch of air gap. This, by the way, is the principle on which Tesla proposes to transmit an electric current from this country to Europe without wires. At a certain altitude the atmosphere will be of this minimum resistance, and that stratum of the air would constitute one path for the current and the earth the other.

I have some special tubes here to demonstrate how the cathode rays produce fluorescence of certain salts and liquids. The display is very striking. Of the several methods for exciting the tube I prefer the induction coil, reasons for which can be brought out in the discussion. Next to the selection of the coil,—and I like the Ritchie very much,—and of almost as great importance, is the selection of the interrupter. Until recently the vibrator was the most commonly used break, and probably is yet, though I think it is destined to be supplanted by the electrolytic breaks. The mechanical breaks are usually very noisy, and the mercury breaks often troublesome. The Tesla oscillators are also very noisy.

With the electrolytic break or interrupter the capacity of the coil is greatly increased. It was discovered less than a year ago by Dr. Wehnelt in Europe, and this form bears his name. It consists of a fine platinum wire from sixteen to twenty gauge, protruding from a glass tube, in which it is sealed, and a lead plate, both in a bath of dilute sulfuric acid. It will work on forty volts. I prefer using it on the one hundred and ten, and have the acid solution so dilute that it serves at the same time as a rheostat. Great trouble has been experienced in making the platinum points adjustable, which is very desirable, and yet durable, owing to the heat and action of the acid. I have overcome this difficulty very successfully in the manner you see here, which is exceedingly simple. The platinum wire is soldered with 20 k. gold solder to a small brass bar of about the same diameter, and the whole placed inside a piece of clay pipe-stem about eight inches in length. The clay is not affected by either the heat or the acid, and while the apparatus is delicately adjustable, it also is very durable. The pipe-stem is adjustable through a rubber stopper in the hard rubber cork (Fig. 5). I consider this form of interrupter very superior to any I know of. It has never failed to work satisfactorily in my hands since this arrangement was devised.

Much could, and should, be said about the selection of tubes, but time will only permit of a word or two. Deal directly with a reliable firm, and use pretty high vacuum tubes. I have several forms. For a description of the most general forms I will refer you to Dr. Kells's admirable paper before the National Dental Association last August. I must speak here of one form, or rather addition, I have made to tubes which is different, and superior for its purpose, to anything I have seen or heard of. It is for screening out all the luminous rays from the tube, while allowing the Roentgen rays to pass. It consists of a jacket of unvulcanized dental rubber. I use the red, as you see here, which is opaque to the X rays for all parts except where the rays are emitted, where I use a window of black rubber, through which the X rays pass unobstructed. This tube is used for making fluoroscopic examinations in total darkness. It works to perfection, and serves the double purpose of assisting to prevent danger of puncture. In general, I will say I like the Queen self-regulating tubes the best. My effort has been to reduce the time for getting good radiographs. Some of the best pictures I will show you this evening were taken in fifteen seconds through dense jaws. This will be much reduced, probably to five seconds or less, for the average; in part by placing a piece of fluorescent screen, specially prepared, each in front and behind the celluloid X-ray film, and part by using a tube of extra high current capacity.

Every class of cases and ages requires a tube of different condition and time of exposure. This requires a large assortment of tubes or adjustable tubes. This is the greatest factor in getting universal success, and should be made the subject of a special paper. I may be able to give some hints when showing the practical cases. In our dental work the ordinary fluoroscope is practically of no use, except to show the condition of the tube. I have constructed some special screens which can be placed in the mouth and the shadow observed by a mouth-mirror. This is only of service in a totally dark room, which this tube with the jacket is designed for. The same effect has been accomplished by others in a less convenient way.

By far the most important way for us to use the X rays is to make a negative. For preparing the plate for this many methods have been suggested. Some use entirely pieces of glass negative, and wrap in black paper. Others use ordinary Kodak film, or special film wrapped and sealed in black paper; some bind with lead or tin foil. To my mind no method I have heard of approaches in convenience and simplicity the one I suggested and reported in my lecture before the Northern Ohio Dental Society last May. It consists simply in placing a large piece of a specially prepared X-ray film which is quite stiff (Carbutt's preferred) between the layers of unvulcanized black rubber, and allowing the rubber to touch around the edges, where you dentists will best know how sure it will cling. This can now be cut through in any direction with a pair of shears, and simply pressing the rubber together where you have cut seals a perfect joint. Of course, this is perfectly impervious to moisture and light, and at the same time offers almost no resistance to the X rays. I put a piece of Eastman's X-ray Bromide Paper in also, with its face to that of the film, thereby getting a photo direct and also serving a double purpose,—in protecting the surface of the film. Occasionally it is an advantage to secure the plate with a special plate-holder, but very seldom do I think it desirable or necessary. The plates prepared in the way I speak of are so convenient; you can bend a corner over thus [demonstrated] anywhere, thereby making the plate any desired shape or size; and of course the rubber adheres to itself and holds it firmly. The plates can be held in place with a finger generally, to get the best results. You will observe a number on each of the slides exhibited. This is done by placing little figures on the outside of the plate-holder. They are made of fine copper wire prepared in advance, and stuck on gum labels. It is a great convenience for keeping records without danger of getting negatives mixed. I have experimented with many opaque inks, but they are not so satisfactory. I have a very complete system for keeping all the records of each case upon the envelope used as the negative preserver, which I will pass around. Note especially that the angles of the rays, the teeth, and the plate to each other are kept in each case. This is very reliable and important, since by it you can at any time determine the exact dimensions.

Before proceeding with the practical cases I want to advise any intending investors to get a small glass-top table on large, rubber-tire casters, or wheels, upon which to keep your coil and accessories, which are few. Also note that it has recently been shown that the time for exposure is in direct proportion to the distance and not to the square of the distance, as has been generally thought.

We now see some lantern views of practical cases, and one or two typical pictures will suffice in each of several classes of cases in which the Roentgen rays are specially well adapted for diagnosis. Unfortunately, a great deal of the detail and information is lost as compared with looking through the negative. Photos, even contact prints, lose about half the detail. In good negatives even the cellular structure of the bone is distinctly shown. This is mostly lost on the screen or in the half-tone used for illustration, so you will have to make a great deal of allowance. For the location of unerupted teeth it is simply perfection.

Fig. 6 illustrates the condition in a case of delayed dentition of the bicuspids. The cuspid has been erupted for some time, and the first deciduous molar shed by the eruption. This upper arch is exceedingly retracted. The radiograph shows that but one bicuspid has formed, and it is thrown out of its course twenty degrees by another. It is absorbing the anterior buccal root of the first permanent molar. A course of treatment is quickly suggested.

In the next (Fig. 7) is a typical example of the appearances of cases where a permanent tooth fails to form and the deciduous is retained. In this case a lower deciduous molar. A lady of about thirty years of age discovered that she still had a baby tooth, and felt so ashamed of herself that she hurried to the office to have it extracted. The radiograph settles all hope of it ever having a successor.

I will now show you a wonderful picture demonstrating the very early calcification of enamel of the permanent teeth (Fig. 8). It is taken of the upper arch of a baby boy of fourteen months, who has no deciduous teeth erupted yet in this arch. The radiograph shows not only the development of all the deciduous teeth, but also the commencement of calcification of the permanent centrals. But this is not all. While his father is lacking his permanent laterals, we can see clearly in the negative, which was a ten-second exposure, even at this young age, the crystal forming for his permanent laterals. I know of the joy of that boy's father at this information, for he is my boy.

An example of lost teeth is shown in the next (Fig. 9), which indicates the whereabouts of the missing bicuspid. There are very many cases of this class.

The next (Fig. 10) shows a lady's upper arch at about thirty years of age. When this picture was taken she was still waiting for her permanent teeth to erupt; but she need not wait longer, for this lone second molar is all she is to have on that side. Five teeth are lacking on that side and three on the other.

In no class of cases is this means of diagnosis of more frequent service than for exploring the various deep pathological conditions. For example, the extent and location of abscesses, the direction and path of the fistula, and, of very great importance, the most dependent point of the abscess. This picture (Fig. 11) shows the appearance of a blind abscess at the apex of a lower incisor. It shows which tooth is affected, and that no teeth in this vicinity have root-fillings to suspect as imperfect.

In the next (Fig. 12) we have some information regarding a case of neuralgia of uncertain cause of years' standing, undoubtedly caused, as proved later, by the blind abscess at the apex of the first upper bicuspid. The abscess was evidently caused by imperfect root-filling, which is clearly shown to only extend half-way to apex. On opening the canal I found putrescence in the apical half of the canal. This negative shows beautifully the cellular structure of the bone.

The next picture (Fig. 13) shows the same root filled to the apex. The blind abscess was drained through the buccal wall of the process.

These abscesses vary greatly in extent, and their exact extent is clearly shown in good radiographs, as, for example, in this picture (Fig. 14), which shows a blind abscess of considerable dimensions and of years' standing, during most of which time it has been almost continually under treatment, so the patient informed me, through the root-canal of the lateral, where it had its inception. The lateral is the tooth nearest the figure 3. These numbers, you remember, are produced by placing metal figures, made of fine copper wire stuck on gum labels, upon the outside of the negative cover when

FIG. 6.

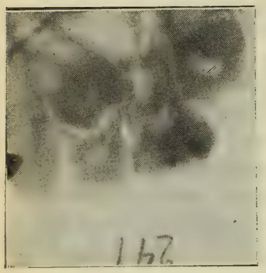


FIG. 7.

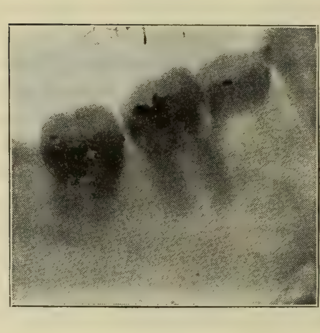


FIG. 8.

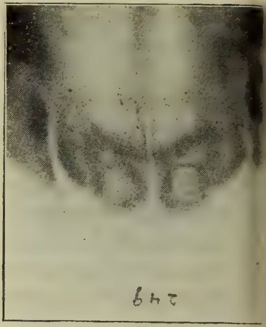


FIG. 9.

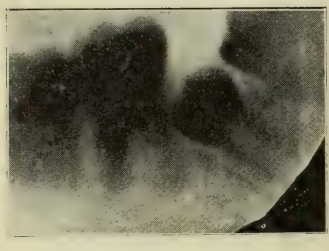


FIG. 10.

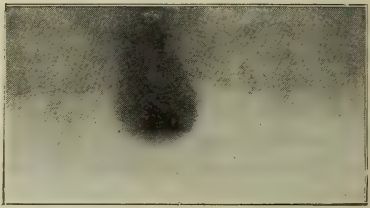


FIG. 11.

FIG. 12.

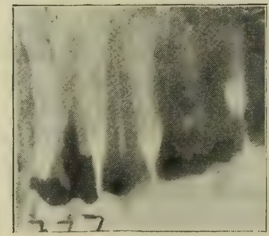


FIG. 13.

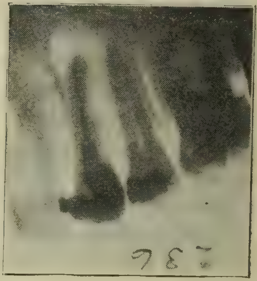


FIG. 14.

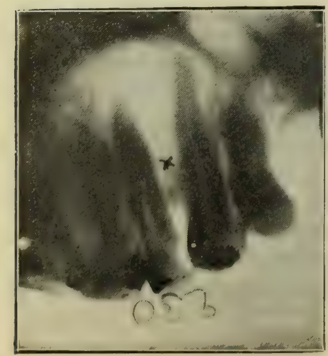
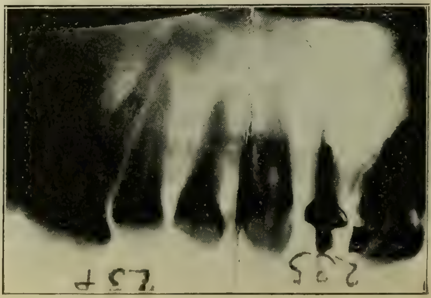


FIG. 15.



the exposure is made, and are invaluable for keeping correct records and for identifying negatives. This picture shows beautifully the most dependent part of the abscess, which I have marked X, and the folly of trying to drain it through the root-canal. On establishing free drainage at X, by drilling through the process, and thoroughly sterilizing and cauterizing the pocket, a permanent and perfect cure was effected in a very few days.

In this next picture (Fig. 15) we have an exceedingly large abscess, and also one of long standing. It had a fistula beside the second bicuspid. The dentist sending the case for radiographing had labored faithfully, but with unsatisfactory results, to cure it. A crown of the lateral had been destroyed to examine the root-filling beyond it, and the second bicuspid had been extracted and replanted in search of exostosis. The radiographs, taken in sections, show the root of the lateral to drain between the roots of the various teeth. It also shows the abscess to extend beyond the anterior buccal root of the first molar.

Fig. 16.

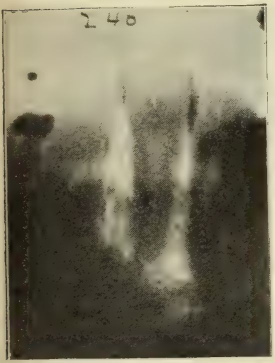


Fig. 17.

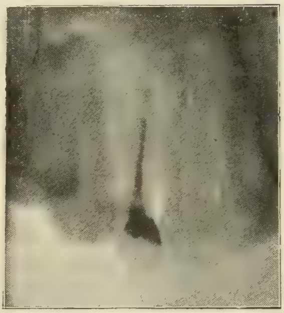


Fig. 18.

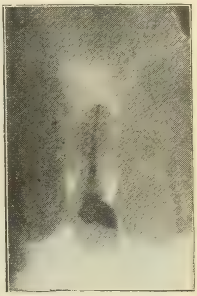


Fig. 19.

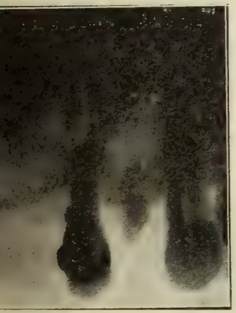


Fig. 20.

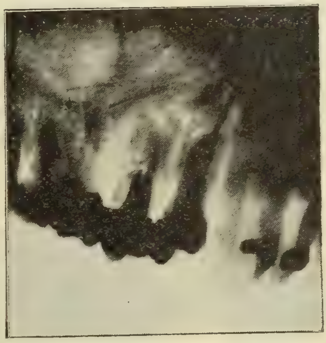
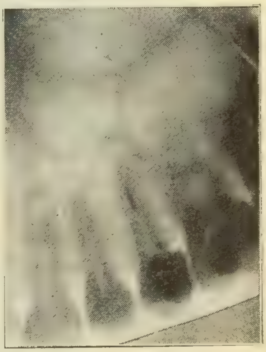


Fig. 21.



The picture now before us (Fig. 16) shows a remarkable change of bone structure taking place around an upper central incisor that had, a couple of years previously, received a hard blow; since which time it has been constantly elongating, though it is very solid in its attachment. The negative shows clearly the old base for the apex from which it has advanced,—about three-sixteenths of an inch. It is an interesting study in pathology. The bone, though forming an unusually firm attachment, is evidently much less dense than normal, and honey-combed in structure. The peridental membrane is almost obliterated.

In the next picture (Fig. 17) we have another blind abscess with its evident cause,—viz, imperfect root-filling. The case was of thirteen years' standing, and had received extended treatment. I amputated the tip of the root, without extraction, at the point where the root-filling ended, as shown by the radiograph, and with splendid results. The next picture shows the same tooth after root amputation (Fig. 18).

In the next picture (Fig. 19) we see how beautifully the bone has adhered around the stub of one of these amputated roots. This amputation was made in January, 1896. The patient claims it to be the strongest, solidest tooth she ever had.

In the next (Fig. 20) we see a broken broach protruding through the apex far into the tissue.

In this picture (Fig. 21) we see much of interest. The radiograph was taken to locate a piece of a cambric needle which the patient had broken in the root while trying to relieve an abscess. It was thought to have been forced through into the tissue, as the apex was found open. It is easily seen lodged in the root, which was evidently bifurcated. This picture also shows beautifully the relation in the case of the teeth to the antrum. You will observe that the roots of the second molar penetrate nearly half-way up through that cavity.

The value of Roentgen rays in orthodontia is almost beyond calculation, for it enables us to see just how our force is being expended. Probably the greatest factor in that work is to move the roots as well as the crowns. In this picture (Fig. 22) we see an attempt to draw two teeth together when, alas! only their crowns have been tipped toward each other.

This next picture (Fig. 23) shows a commencement of a case where separation the width of a tooth (one having been recklessly extracted) is required; and in the next picture (Fig. 24) we see how well this has been accomplished. Unfortunately, time only permits of one example of a few classes of cases out of a great many.

The next (Fig. 25) shows beautifully the fit of these crowns and the depth of a pyorrhea pocket, supposed, marked X. The radiograph shows a perforation in the wall of the root of the first bicuspid, through which cement has been forced into the tissue, producing the suppuration and absorption supposed to be a pyorrhea pocket.

In this next picture (Fig. 26), we have an example of the service of the Roentgen rays in determining the location of third molars. This one is not erupted at all, and lies at just right angles to its proper position, as shown by the second molar. It would certainly be a difficult one to extract if you did not know its position.

Gentlemen, we must not take time for more, and I ask your pardon for keeping you so long. I shall be glad to allow any one interested to make observations with the Roentgen rays or examine the apparatus after the dismission, or to ask questions.

FIG. 22.

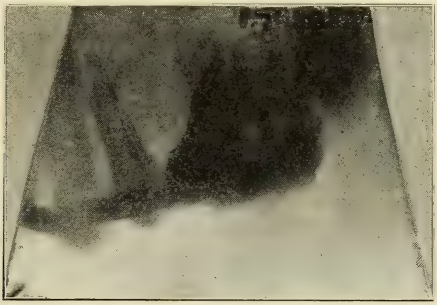


FIG. 23.

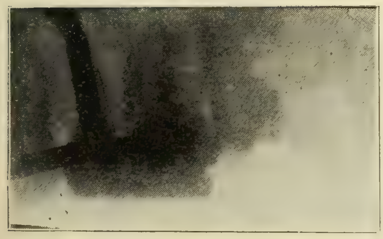


FIG. 24.

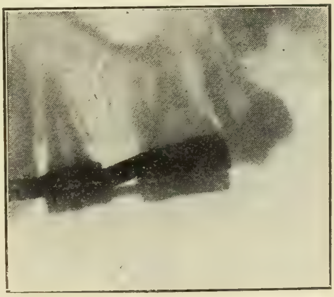


FIG. 25.

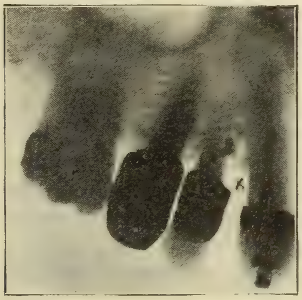


FIG. 26.

I want to thank Professor Thomas, of the Ohio State University, for his great kindness in helping me out of a predicament this evening. The coil I expected to use, which you see here, was so roughly handled in the express that it was disabled, and he very kindly brought me down one at the last moment from the university.

ON A PATHOGENIC YEAST-FUNGUS FOUND IN THE ORAL CAVITY.

BY W. D. MILLER, D.D.S., M.D., BERLIN, GERMANY.

In this short communication I wish to present a series of observations which I made some five years ago concerning a pathogenic yeast-fungus of the oral cavity. Untoward circumstances at the time interrupted the course of the experiments, which it has since then unfortunately been impossible to resume, for the reason that the cultures of the fungus in question had died in the mean time, and new cultures could not be procured. Although the work was, for this reason, not completed, it nevertheless led to some results which seem worthy of notice.

While making repeated tests of the secretions of the mouth by means of pure cultures, I frequently observed on the culture-plates large gray, or yellowish to snow-white, colonies, which on microscopical examination were recognized as colonies of yeast-fungi.

A number of times I met with the same result in the case of diseased tooth-pulps; but I attached no particular importance to this observation until in cultures from two different pulps so many of these colonies appeared upon the plates that I was induced to investigate the matter more closely. The cultures, as well as the inoculations, gave results leaving but little doubt as to the fungus in question being closely related to, if not identical with, the Thrush fungus, Saccharomyces albicans. It might therefore appear superfluous to dwell any longer upon this observation, the numerous investigations of late years having pretty thoroughly solved the questions regarding the biology of the fungus under consideration. Nevertheless, my experiments have brought out a number of points which will be of interest to bacteriologists as well as to dental pathologists.

In the first place the presence of yeast-fungi in suppurative processes could not fail to attract attention, as it was formerly generally supposed that this group of fungi—and in particular Saccharomyces albicans—was incapable of causing suppuration. The pure cultures in question again clearly testify (as has been claimed for Saccharomyces albicans) that a specific yeast-fungus may, under certain circumstances, develop forms which are liable to lead the observer into mistaking it for a mold-fungus.

In pure cultures on agar this fungus grows, on the surface, in large, snow-white moist colonies, which, as they become older, show a jagged edge; whereas under the surface the colonies, with their numerous offshoots, often present a certain resemblance to miniature bugs (Fig. 1).

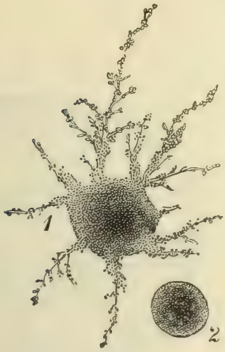
In tube cultures it either grows in a granular form, without any peculiar characteristics, or it develops very fine, thread-like processes around the line of puncture, very similar to the Wurzel bacillus. On gelatin it grows well without producing liquefaction.

Rather remarkable growths are produced when in line cultures on glycerol-agar or -gelatin the air is excluded by the means of large cover-glasses. Especially those colonies near the border of the glass throw out numerous offshoots, which, by divisions and ramifications, produce very graceful figures (Figs. 2 and 3).

In gelatin cultures I have observed that these ramifications were all directed toward the border of the cover-glass.

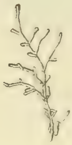
Cover-glass preparations of such colonies showed diverse forms: round, oval, cylindrical, as well as such that had developed into long threads. In bouillon cultures only specific yeast-fungus cells were to be found (Fig. 4). A two-days' old culture on potatoes showed round and oval forms, with numerous buds (Fig. 5); after five days a number of cylindrical cells had developed, many of them showing granular degeneration, as was also the case in older cultures on agar (Fig. 6). In cultures on bread I found only oval and cylindrical forms.

FIG. 1.



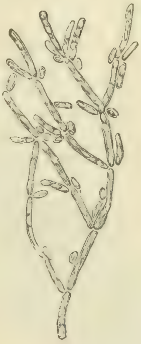
1. Colony under the surface, slightly magnified; 2. Surface colony.

FIG. 2.



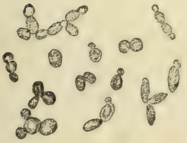
Branch of a colony. 110:1.

FIG. 3.



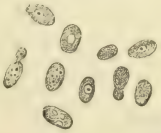
Branch of a colony at 250 diameters.

FIG. 4.



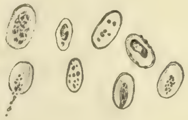
Culture in bouillon. 300:1.

FIG. 5.



Culture on potato. 300:1.

FIG. 6.

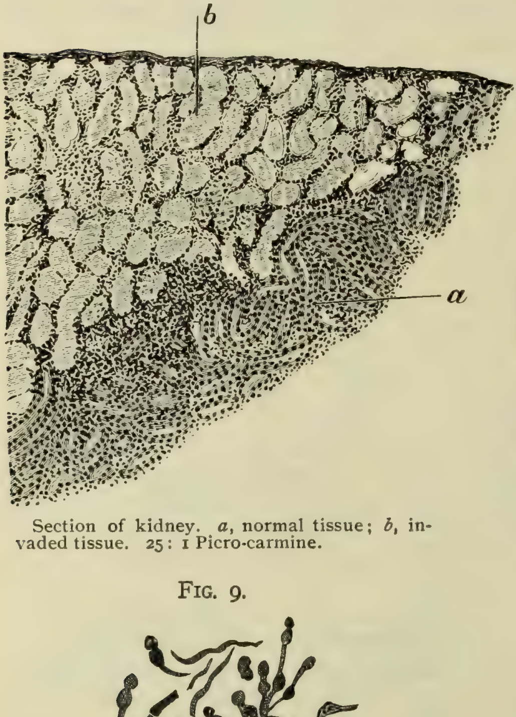


Seven-day old culture on agar. 300:1.

A watery emulsion subcutaneously injected into a mouse caused death in forty-eight hours. There was no noteworthy reaction at the point of infection, nor were there any fungus-cells to be found in the blood, whereas there was a pronounced colonization in the kidneys and in the liver, as well as several nodules in the lungs. In the kidneys the colonies, especially directly beneath the capsule, were so numerous that these organs appeared literally studded with small white specks. The microscopical examination showed—in those parts where a stronger accumulation of fungi had taken place—necrosis of the epithelium of the urinary canals and their obstruction by a homogeneous matter, as well as a cellular infiltration of the interstitial tissue (Figs. 7 and 8).

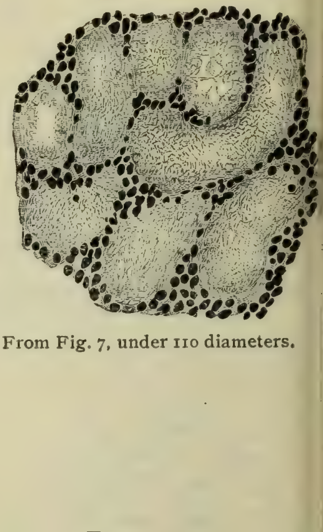
A second mouse, also subcutaneously injected, showed decided symptoms of a general infection for two days, but then recovered, and was killed on the fifth day. A small abscess was found in the wall of the left ureter, in which yeast-fungi were present in considerable numbers. A third mouse presented the same symptoms.

FIG. 7.



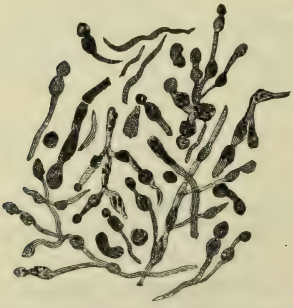
Section of kidney. *a*, normal tissue; *b*, invaded tissue. 25: 1 Picro-carmine.

FIG. 8.



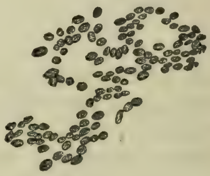
From Fig. 7, under 110 diameters.

FIG. 9.



Forms of the yeast-fungus from the kidney. 1000: 1.

FIG. 10.



Yeast-cells from an abscess. 300: 1.

On the sixth day a bean-sized abscess was discovered at the point where the injection had been made, containing numerous round and elliptical yeast-fungus cells (Fig. 10). The microscopical examination of the pus revealed the presence of only yeast-cells. Cultures on agar also developed only yeast-fungi. In a fourth mouse, infected in the same way, a pronounced fibrinous exudation was produced at the point of infection, but there was no suppuration.

If we were to draw a conclusion from these several observations, it would be to say that the questionable yeast-fungus not only possesses invasive qualities, but, besides, under certain circumstances, brings about suppurative processes.

Similar conclusions were arrived at by Busse (*Virchow's Archiv*, Bd. 140, p. 23) in the study of a yeast-fungus, designated by him as Saccharomyces hominis.

USES AND LIMITATIONS OF FORMALDEHYD IN DENTISTRY.

BY DR. F. W. LOW, BUFFALO, N. Y.

(Read before the Annual Convention of the Seventh and Eighth District Dental Societies of the State of New York, October 25, 1899.)

TWENTY years after its discovery formaldehyd was still *almost* an unknown quantity to the average pharmacist. Truth-hunters for truth's sake, reporting their findings at infrequent intervals, averred its undoubted and surpassing virtue until at length sufficient interest was finally awakened to challenge a general investigation. Then, all at once, the unthinking many began to herald numerous doubtful and ofttimes most manifestly impossible achievements.

Such unwarranted hue and cry of the faddists and empiricists resulted shortly in the usual "black eye" being administered to the new-found remedy.

What wonder that "doubting Thomases" should logically have their innings when "Through a stone floor," "To the center of mattresses," "Penetrating innumerable thicknesses of pillow-slips and blankets," are but fairly average samples of the bill-board announcements indiscriminately published in many of the more reckless so-called scientific journals.

"Innocuous to man, but sure death to 'bugs.' Hail! to formaldehyd, the new germ-destroyer."

Following in contrast is the gospel the anti-formaldehydists preach:

"At best, formaldehyd is but a surface disinfectant, and not always sure at that."

"A pure atmosphere of it will invariably kill a cat."

"It is innocuous to man only because *he* cannot abide in it long enough to die decently."

"It almost puts one's eye out just to get the merest whiff of it."

Now who shall decide for us when doctors so disagree?

Perhaps we'll go least far astray by accepting the consensus of up-to-date *conservative* opinion. This I attempt to summarize before discussing uses and limitations in dental practice. I shall not detain you with numerous quotations, however, choosing rather to cite a few comparisons from authorities undoubted,—those which after careful reading and proper investigation I have elected to esteem the highest.

Concerning Penetration.—On the subject of house disinfection

Williams, in his most recent publication,* sums up as follows: "Instead of formaldehyd, sulfur dioxid may be used for room disinfection, but in the light of recent knowledge the formaldehyd method is superior."

This opinion of Dr. Williams—who is professor of pathology and bacteriology, Medical Department, University of Buffalo—is that, also to my knowledge, of Professor Roswell Park, director of the New York State Pathological Laboratory for the investigation of cancer; of Dr. Ernest Wende, health commissioner of our city, and of Drs. Bissell and Carpenter, who are respectively chief and assistant bacteriologists in the Buffalo Bureau of Health.

Concerning the Tendency of Albuminous Matters to Retard Antiseptic Action.—"As compared with other disinfectants, such as corrosive sublimate, carbolic acid, lysol, etc., formaldehyd solutions have the advantage *of not being retarded*" (italics mine).—A. E. DeSchweinitz, Ph.D. (Dr. DeSchweinitz is chief of the government bacteriological laboratory at Washington.)

Concerning Certainty of Disinfection.—"Formaldehyd has extraordinary powers as a surface disinfectant, greater than that of any other known substance."—Charles Harrington, M.D., Harvard Medical School, Boston, Mass.

Concerning its Poisonous Effects upon Higher Forms of Life in a Concentrated Atmosphere.—"It is *not* poisonous in the sense of easily destroying the higher forms of life, but the human subject suffers great discomfort upon being long exposed to it."

Concerning Certainty of Action.—"Of one thing there is no doubt, when formaldehyd in certain quantity comes in contact with the bacilli of infectious diseases they are surely killed."

"A comforting fact also is that infectious material from a patient is more easily sterilized than artificial cultures."

"There is some further comfort for those who have begun to use formaldehyd in the fact that its only alternative is sulfurous acid, which will not destroy diphtheria infections or others as resistant."

These latter quotations are from the report of the committee of publication which edited the *Journal of the American Public Health Association,* 1898. Franklin C. Robinson, professor of chemistry in Bowdoin College, Maine, was chairman of this committee.

I might multiply proof indefinitely perhaps without making stronger evidence concerning the efficacy of formaldehyd as a general surface disinfectant.

Uses and Limitations.—To us as experts in the proper use of it, formaldehyd comes in one of three following guises:

In aqueous solution, sometimes with—sometimes without—the addition of other antiseptics.

As a paraform lozenge, or else we are presented with a miniature factory over which we are expected to exercise a superintendency.

Formaldehyd in aqueous solution is useful in various dilutions as a *wash*, both for persons and for things. 1 to 2500 with one hour's contact has been found by a contributor to the *Pharmaceutical Journal* as adequate to destroy any and all micro-organisms,—even the most resistant. 1 to 500 is recommended by this writer as a mouth-wash, and 1 to 250 as a general disinfectant for washing hands, instruments, etc., in surgery, and for spraying apartments as a deodorant.

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*"A Manual of Bacteriology," by Herbert U. Williams, M.D., Professor of Pathology and Bacteriology, Medical Department, University of Buffalo. Blakiston's Sons & Co., Philadelphia.

Parke, Davis & Co., in their latest pamphlet, quote the *University Medical Magazine* as authority for the statement that a four per cent. solution will almost immediately deodorize feces. Acting on this suggestion, I have found that a four per cent. solution will completely deodorize that most distressing odor which sometimes persists in clinging to my fingers after the tedious treatment of a putrescent pulp-canal.

In regard to washing dental instruments in solutions of formaldehyd, my experience coincides with the findings of the committee of publication of the *Journal of the American Public Health Association:* "The dry gas seems without action upon polished metallic surfaces, but in the presence of water bright steel is quickly attacked; hence its water solution is unfit for sterilizing instruments."

For all office cuspidors as a deodorant formaldehyd solutions cannot be too highly recommended. It must be borne in mind, however, that nickel-plated ones will be attacked and tarnished by its use; 1 to 250 is the proper strength solution.

There is but one further use for aqueous solutions of formaldehyd in dentistry that I am aware of. I refer to its employment in supplanting the older antiseptics in treatment designed to render aseptic the putrescent pulp-canal. If solutions have proven tolerable for the purpose of irrigation in or about the deeper pockets of pyorrhea or for syringing out a freshly opened abscess, I should be glad to know. I have been thus far afraid to try, fearing unduly painful consequences. Two experiences which I have had resulting from its employment in pulp-canals have made me cautious to the point almost of abandonment. In both cases the solution used was 1 to 250.

The Paraform Lozenge.—Schering & Glatz, New York agents for a German company, have extensively advertised the advantages to be derived from the employment of the paraform lozenge in generating formaldehyd. There are limitations to this method compared to others: first, because the cost of maintenance in commission is very considerably greater, and second, because in order to generate the gas from lozenges in sufficient quantities to be really effective a fresh lozenge must be placed in the heating receptacle for dissipation as often as every fifteen or twenty minutes. I believe these manufacturers make the claim, however, that one lozenge is sufficient to sterilize dental instruments in an oven which they furnish with their lamp for that purpose.

Lamps that Generate the Gas Formaldehyd from Methyl Alcohol.—Of this type of generators there are quite a number of manufacturers. The lamps, while differing very considerably in *manner* of construction, all depend in fact upon the same general principle,—

namely, the action by its presence merely, without entering into chemical combination, of glowing hot platinum upon the fumes of methyl alcohol.

The only use which a lamp of this construction can have in dentistry is to sterilize our instruments, or, better still, the whole instrument-containing cabinet, with its contents, including napkins, forceps, ligatures, dams, and whatever other appliances are likely to be used in or about the mouth, by means of turning in upon them while the case is closed the dry formaldehyd gas.

I have recently been conducting a series of experiments with apparatus here exhibited, in anticipation that results might be deemed of interest by this section of the National Dental Association. My findings are submitted with no little trepidation, principally because I am not competent either as microscopist or bacteriologist.

Experiments which are reported I could not have conducted but for the active co-operation of my friend Dr. Thos. B. Carpenter, assistant bacteriologist to the Health Department of the city of Buffalo, to whom I desire thus publicly to make most grateful acknowledgments.

EXPERIMENTS, SERIES NO. 1.

Made to determine if possible, with dry gas formaldehyd fumigation in close confinement, what might be the shortest effective exposure for purposes of "scaling-instrument" sterilization.

In this series measures were also incidentally taken to determine whether a flow of fresh gas from lamp over instruments was more effective than to completely shut off all ventilation.

Since I had no hand personally in this series of experiments, it will suffice that I submit Dr. Carpenter's report without comment, further than merely to show you how the instruments were confined, how ventilation was accomplished, and the manner of conveying the gas from the lamp onto the contaminated instruments.

[Dr. Low here exhibited lamp and tray for holding the instruments while being disinfected.]

BUFFALO, N. Y., July 14, 1899.

DR. FRANK W. LOW, Buffalo, N. Y.

Dear Doctor,—I herewith present report of experimental work performed upon your disinfecting tray for dental instruments.

Experiment 1.—Six dental instruments used in a case of pyorrhea alveolaris were submitted. Nos. 1, 2, and 3 were used for control. Nos. 4, 5, and 6 were placed in the tray and subjected to the action of formaldehyd generated from the Low lamp, using porcelain combustion cone. All vents in the tray were wide open. The time of exposure was ten minutes. Ammonia gas was then passed through the tray, for about half a minute, in order to break up any possible combination between the disinfectant and the micro-organisms. All of the instruments were dipped into sterile bouillon to soften the adherent material, then inoculations were made into Löffler serum, and all placed in incubator. After twenty-four hours, results were as follows:

Control	1.	Luxuriant growth.
	2.	“ “
	3.	“ “
	4.	No growth.
	5.	“ “
	6.	“ “

After forty-eight hours:
4. No growth.
5. Doubtful.
6. Doubtful.

Mounts were made from all tubes, stained with Löffler methylen blue, and examined. The following results were obtained:

1. Staphylococci, streptococci, and a short bacillus.
2. “ “ “ “
3. “ “ “ “
4. No growth.
5. Few staphylococci.
6. “ “

The above results demonstrate the restraining power of the disinfectant under the conditions of test.

Experiment 2.—Six platinum needles, mounted in glass rods, were sterilized and touched to an agar culture of the Staphylococcus pyogenes aureus and dried. Nos. 1, 2, and 3 were reserved for control. Nos. 4, 5, and 6 were treated in the same manner as the instruments in Experiment 1. After twenty-four hours' incubation results were observed as follows:

Control
1. Abundant characteristic growth.
2. “ “ “
3. “ “ “
4. No growth.
5. “ “
6. “ “

After forty-eight hours:
4. Doubtful.
5. “
6. “

Mounts were made from all tubes and examined with following results:

Control
1. Characteristic staphylococci.
2. “ “
3. “ “
4. Few staphylococci, taking stain poorly.
5. “ “ “ “ “
6. “ “ “ “ “

This experiment demonstrates the restraining power of the disinfectant It is evident, however, that under the conditions of the experiment, ten minutes' exposure to the gas with open vents in the tray, the action is not sufficient to destroy the organism.

Experiment 3.—Four platinum wires were prepared as in Experiment 2. Nos. 1 and 2 were reserved for control. Nos. 3 and 4 were subjected to the action of the gas for fifteen minutes with the top vent of the tray closed. After inoculation on serum and incubation for twenty-four hours, results were observed as follows:

Control
1. Abundant characteristic growth.
2. “ “ “
3. No growth.
4. Slight growth.

Mounts were made from all tubes, confirming the presence or absence of growth and absence of contamination.

Wire No. 3 had a large amount of culture attached to it. No. 4 had a small but very apparent amount attached.

It seems evident from the above experiments that the gas, in the time allowed, and under the conditions of the test, will not penetrate and kill through a deep layer of organisms.

Experiment 4.—Four wires were inoculated with the Bacillus pyocyaneus (by dipping into a bouillon culture of the organism) and dried. Nos. 1 and 2 were reserved for control. Nos. 3 and 4 were placed in the tray, with all vents closed, and subjected to the action of the gas for fifteen minutes. Inoculations into bouillon from all wires and incubated forty-eight hours, gave results as follows:

Control { 1. Characteristic growth.
{ 2. “ “
3. No growth.
4. “ “

This experiment shows that under the conditions of the test, closed vents and exposure of this layer of organisms, the Bacillus pyocyaneus is destroyed by fifteen minutes' exposure.

Experiment 5.—This experiment differed from Experiment 4 only in time of exposure, ten minutes being given instead of fifteen minutes.

The results after forty-eight hours' incubation were as follows:

Control { 1. Characteristic growth.
{ 2. “ “
3. No growth.
4. “ “

The above series of experiments were repeated twice in all cases, and in many cases three times. The results were uniform. I am therefore of the opinion that this apparatus can be relied upon, after an exposure of from ten to fifteen minutes, to destroy thin layers of the commoner, non-sporulating, pathogenic organisms. Very truly yours,

Thos. B. Carpenter.

Experiments, Series No. 2.

This series was primarily conducted with a view to ascertain if school clothing of children or a suit worn by nurse or doctor into the presence of contagion might be thoroughly sterilized by placing them in a wardrobe and leaving them exposed over night to the fumigation of this little lamp.

Satisfactory results reported by Dr. Carpenter suggested the possibility of the Low disinfector being installed for purposes of instrument, ligature, and napkin fumigation without removal from their various receptacles in the modern dental instrument cabinet.

On this series Dr. Carpenter reports,—

Buffalo, N. Y., July 15, 1899.

Dr. F. W. Low, Buffalo, N. Y.

Dear Doctor,—I herewith report results of experimental work upon the Low formaldehyd lamp.

The material used in each experiment consisted of cotton threads thoroughly soaked in bouillon cultures of the following organisms: Staphylococcus pyogenes aureus, Bacillus pyocyaneus, Bacillus diphtheriæ, Bacillus typhi abdominalis, and Bacillus anthracis (sporulating). The threads were thoroughly dried before exposure to the action of the lamp. The disinfecting chamber consisted of an ordinary tight closet, with a capacity of 15.8 cubic feet. In all tests the lamp was placed upon the floor of the closet and allowed to burn for twelve hours. A wire combustion cone was used. After removal of the lamp, ammonia gas was generated in the closet and the threads were allowed to remain for fifteen minutes in this atmosphere. This was done to destroy any possible chemical combination between the organisms and the formaldehyd gas. Four impregnated threads of each organism were used in each test, only two of which were exposed to the gas. The other two were used for control. The test threads were exposed in open Petri dishes. In each case the growths were examined to determine the presence of the test organism.

Experiment 1.—The dishes were placed on the floor of the closet near the lamp. Control threads = characteristic growths. Test threads = no growth after forty-eight hours' incubation.

Experiment 2.—Dishes placed one foot above lamp. Control threads = characteristic growth. Test threads = no growth after forty-eight hours' incubation.

Experiment 3.—Dishes placed two feet above lamp. Control threads =

characteristic growth. Test threads = no growth after forty-eight hours' incubation.

Experiment 4.—Dishes placed three feet above lamp. Control threads = characteristic growth. Test threads = no growth after forty-eight hours' incubation.

Experiment 5.—Dishes placed four feet above lamp. Control threads = characteristic growth. Test threads = no growth after forty-eight hours' incubation.

It is evident, therefore, that twelve hours' exposure to the action of this lamp, in a closet of 15.8 cubic feet capacity, is sufficient for effective surface disinfection, the most resistant pathogenic bacteria being destroyed.

Truly yours, THOS. B. CARPENTER.

EXPERIMENTS, SERIES NO. 3.

These were conducted in some instances by myself, at other times by various of my *confrères* in Buffalo, the object being to determine if methods usually in vogue for the care of our scaling instruments were adequate.

Recently the promulgation of the locally pathogenic origin of pyorrhea has made this inquiry doubly pertinent.

Test tubes corked with sterile cotton containing sterile beef tea were taken about to different offices, where at the dentist's operating case they were opened after being burned over in Bunsen flame, both plug and mouth of tube thus doubly treated.

When opened instruments, as indicated by subjoined reports, were carefully projected into the tubes and their points immersed in culture-media, when they were as carefully withdrawn and the tube at once replugged. The tubes so treated were then submitted to Dr. Carpenter for incubation and subsequent observation and report.

It would be manifestly wrong to mention the names of the gentlemen who submitted their instruments to this examination. I may, however, be permitted to say that I purposely avoided tests being made upon instruments of any practitioner where I harbored doubt about the most cleanly practices in the care of them.

TUBE NO. 1.

Inoculation with fifteen scalers from my own instrument case.

My method of sterilization was to wash in very hot soapsuds, after which instruments were dipped in hot formaldehyd solution 1 to 250, wiped dry, and put away.

Test Report of Dr. Carpenter.

"I append results of examination of bouillon culture in test tube No. 1, submitted by you.

"There was found a luxuriant orange-colored growth.

"Microscopical examination shows it to be a sarcina, evidently the Sarcina aurantia."

TUBE NO. 2.

Inoculated with sixteen scalers from operating case of Dr. A.

His method of sterilization is to wash in hot soapsuds only, except upon occasions when specific infection is feared. In such case an antiseptic, usually three per cent. pyrozone, is used.

Test Report of Dr. Carpenter.

"Found fair yellow-colored growth.

"No odor.

"Zooglear masses. A very small coccus. Evidently not a pus coccus."

TUBE NO. 3.

Inoculated with set of five scalers from operating case of Dr. B.

Method employed in cleansing not stated.

Test Report of Dr. Carpenter.

"Found luxuriant white growth. No odor. Green mold on top. Microscope shows mixture of large cocci, both staphylococci and streptococci. Not pus organisms."

TUBE NO. 4.

Inoculated with twenty scalers from operating case of Dr. C.

His method of sterilizing is to wash in hot soapsuds unless specific infection is suspected. In such cases with pyrozone.

Test Report of Dr. Carpenter.

"Found good growth. Foul odor. Contains the B. proteus and a large coccus, not a pus coccus."

TUBE NO. 5.

Inoculated with seven scalers from operating case of Dr. D.

His method of sterilization is to dip points into three per cent. Oakland Chemical Co.'s peroxid. Then into four per cent. formalin solution. Wipe dry.

Test Report of Dr. Carpenter.

"Found slight growth containing staphylococci and streptococci. Not characteristic of pus organisms."

TUBE NO. 6.

Inoculated with five scalers from operating case of Dr. E.

Method of cleansing not stated.

Test Report of Dr. Carpenter.

"Found green mold on top. Luxuriant white growth without odor. Contains a large streptococcus and an actively motile bacillus. Evidently not pathogenic organisms."

TUBE NO. 7.

Inoculated with six scalers from operating case of Dr. F.

His method of sterilization is to dip in from two to five per cent. Merck's formaldehyd.

Test Report of Dr. Carpenter.

"Found heavy white growth without odor. Microscopic examination shows it to be a pure culture of some form of Leptotricheæ."

TUBE NO. 8.

Inoculated with three instruments from operating case of Dr. G.

His method of sterilization is to wash in hot water and wipe dry, except in cases where specific infection is suspected.

Test Report of Dr. Carpenter.

"Found heavy white growth. No odor. Contains a large coccus and a non-motile bacillus, not pathogenic."

TUBE NO. 9.

Inoculated with instruments, number not stated, from operating case of Dr. H.

Method of cleansing instruments: Scrub with brush in cold soap and water.

Test Report of Dr. Carpenter.

"Found a uniformly turbid culture without odor. Green mold on top. Contains a large non-motile bacillus, not a pathogene."

TUBE NO. 10.

Inoculated with instruments, number not stated, from operating case of Dr. I.

His method of sterilization is to wash thoroughly with cold water, then with dioxid of hydrogen, three per cent. (Oakland).

Test Report of Dr. Carpenter.

"Found a uniformly turbid culture without odor. Green mold on top. Contains a large coccus, not a pathogene."

TUBE NO. 11.

Broken. No report.

TUBE NO. 12.

Inoculated with four scalers from operating case of Dr. J.

Method of cleaning: Give them a good scrubbing in soap and water.

Test Report of Dr. Carpenter.

"Found heavy white growth. No odor. Large coccus, not a pus organism."

TUBE NO. 13.

Accidentally broken. No report.

TUBE NO. 14.

Inoculated with six scalers from the operating case of Dr. K.

Method of cleansing: Wash in tepid water, dip points in three per cent. pyrozone.

Test Report of Dr. Carpenter.

"Found green mold. Nothing else."

TUBE NO. 15.

Inoculated with instruments, number not stated, from operating case of Dr. L.

His method of cleansing is to wash in boiling water.

Test Report of Dr. Carpenter.

"Found heavy yellow growth without odor. Examination shows it to be a sarcina, evidently the Sarcina lutea."

TUBE NO. 16.

Inoculated with seven instruments from cabinet operating tray of Dr. M.

His method of sterilizing is to boil in bicarb. soda water. Polish with emery-cloth, dip three per cent. Oakland.

Test Report of Dr. Carpenter.

"Found white mold on top. Small coccus in gelatinous zooglæ. A form of myxomycete."

TUBE NO. 17.

Inoculated by myself with single broach which had been immersed in a supposedly pyorrhea pus.

It was then immediately dipped in a three per cent. peroxid, where it was held a moment, after which it was immersed in culture tube to learn if short time exposure to three per cent. peroxid is sufficient to destroy germs.

Test Report of Dr. Carpenter.

"Found luxuriant growth in heavy masses. A very large streptococcus, not a pathogene."

TUBE NO. 18.

Inoculated by myself with nine miscellaneous instruments taken from the operating case of my neighbor, Dr. Barrows.

When last used they were washed in cold soapsuds, then placed in compartment of case that smelled strongly of formalin from fumigation of previous forty-eight hours. This test was made to determine if case had continued sterile from previous fumigation.

Test Report of Dr. Carpenter.

"Found white mold on top. Small coccus in gelatinous zooglæ. A form of myxomycete. Same as tube 16."

TUBE NO. 19.

Inoculated with twenty miscellaneous instruments which had been kept over night in a Harvard scroll-front cabinet instrument case, in which a Low disinfector was in constant operation.

Test Report of Dr. Carpenter.

"Found sterile."

Tubes Nos. 20 and 21 were not used.

TUBE NO. 22.

A single broach was inoculated from a supposedly pyorrhea pocket. Mode of inoculation was to burn probe before inserting into pocket. It was then transposed to culture tube at once.

Test Report of Dr. Carpenter.

"Found fairly good growth. Examination shows it to be a myxomycete."

In concluding his report of this entire series of test-tube cultures Dr. Carpenter says that "the organisms found are all derived from the air and from damp, moldy surroundings. The finding of so many molds leptothrix and myxomycetes is very unusual in any series of cultures." This leads him to believe that the source given (damp mold) is correct.

It must be remembered that the instruments were cleaned and put away the night before. They were taken direct from their respective places in the dental cabinet the following morning, care being taken that they came in contact with nothing to contaminate, and that whatever cultures were obtained from them had been communicated either from the air or picked up from contact with the lining of the drawer or tray in which they rested. With this borne in mind, the series appeals to me as altogether most interesting and instructive.

Does it prove that methods in vogue for the care of our scaling instruments are inadequate?

Every set *except the one where the whole case was fumigated* over night produced some cultures, but not one set developed a culture of pathogenic organisms.

The interesting question *now* becomes, Does the possibility of inoculation seem great enough to demand the fumigation of scalers just previous to their using, or would it be preferable in future to provide for cabinet fumigation, or can we feel warranted in going on "in the same old way"?

Of one thing my investigations have made me confident. Of all known methods for sterilizing instruments, fumigation with *dry formaldehyd* gas is most easy of accomplishment and altogether certain.

Dr. Barrows reports the following case of the use of formalin cataphorically:

> This was a case of "blind" abscess, the most difficult to treat, perhaps, of all the various pathological conditions coming under the dentist's care.
>
> The tooth presenting was the left upper first molar, and was under treatment by the usual methods for about four months,—that is, intermittently,—and every time that an attempt was made to fill roots and seal up cavity all the symptoms of previous trouble returned. In desperation I decided to try formaldehyd cataphorically.

I first adjusted rubber dam and thoroughly dried root-canals by hot air. Then I wound a few strands of cotton around a probe electrode, dipped it in formalin,—full strength,—inserted in one of the root-canals and turned on the current for five minutes. I treated remaining canals same way and filled the cavity. This was done in February last, and everything has been quiet since.

Since the report of Dr. Barrows came I have made some experiments to show the effect of the cataphoric current upon litmus after it had been saturated with formalin. I had previously tested many other combinations of drugs and chemicals, and had invariably found that marked decomposition was the outcome.

The electro-positive elements of every other medicament had divorced themselves from the electro-negative, the electro-positive seeking the negative pole, while the electro-negative sought the positive pole.

With formalin so treated no such phenomena obtain, but the formaldehyd seems rather to be given off equally from the whole length of the litmus strip in its original form as gas. This would seem to indicate that it is the penetration of the eliminated gas which did the business for Dr. Barrows so effectually.

The topic which I chose as the title of this essay is by no means yet exhausted, but the essay is already overlong. In conclusion, permit me to thank you for your very patient and courteous attention.

IS IT POSSIBLE TO JUMP THE BITE?

BY RODRIGUES OTTOLENGUI, M.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society of the State of New York, Nov. 14, 1899.)

THE operation known as "jumping the bite" was first performed by Dr. N. W. Kingsley, in 1872, as I discover from his private records, to which I have been permitted to have access. This was in the mouth of a casual patient from a distant city, who thenceforth passed out of his hands, so that the subsequent history is not attainable. Another case, however, recorded as completed in 1876, and later reported to the Odontological Society in a paper which was published in the DENTAL COSMOS for 1878, was a young woman who has continued in her attendance as one of his patients. This lady is personally well known to me, as I have had the care of her mouth for a number of years. The protrusion, judging from the illustrations in the DENTAL COSMOS, was quite marked, and that the correction, by jumping the bite, has been permanent I can testify, as the teeth now, after the lapse of over twenty years, are in good occlusion, despite the fact that the incisors have been attacked by pyorrhea alveolaris.

It is therefore a singular fact that, outside of Dr. Kingsley's own papers, little has been contributed to the literature in connection with this operation by other writers, the principal papers having been adverse or critical.

In 1892 Dr. Eugene S. Talbot read a paper before the New York

State Dental Society, in which occurs the following passage (DENTAL COSMOS, 1892, page 791):

"Considerable was said years ago about 'jumping the bite,' as it is called, and a number of articles have appeared this past winter in the dental journals in which this subject has been revived. As I understand this phrase, it consists in throwing the lower jaw forward one-half the width of a bicuspid, thus bringing the lower incisor closer to the posterior surfaces of the upper incisors, and also causing the chin to become more prominent. In a case like this one of two conditions exists: either the upper jaw has developed beyond its normal position, or the lower jaw is arrested in its development. The latter is most likely the case in a large majority of cases. In either case the articulation at the joint is in a normal condition. I have never been able to 'jump the bite,' although I have tried it in a number of cases. I do not believe any one else has been able to accomplish it, nor do I believe that such a thing is possible. Were such a thing possible, one of two things must take place: First, absorption and deposition of bone-cells must take place at the weakest part of the jaw,—namely, at the angle,—to allow of the forward movement, which is out of the question for two reasons: First, there is not pressure enough; and, second, if it could take place, the articulation of the teeth would be spoiled. Second, there must be a forward movement by absorption of the condyle in the glenoid cavity of the same amount of space to correspond to the forward movement of the teeth, which is out of the question for three reasons: First, there is not pressure enough to produce the absorption; second, tissue in front of the cavity would become involved; and, third, nature would not construct a new cavity to accommodate the condyle."

Prior to the reading of this paper I had the honor to receive a typewritten copy, together with an invitation to take part in the discussion. In the published report of the paper Dr. Talbot says that, as he understands the phrase, the operation "consists in throwing the lower jaw forward," etc., but in the copy which I had the reading was "forward or backward." The difference between the original wording and the published account discloses that the distinguished author comprehended the phrase better after hearing the discussion of his paper, a fact which is not cited here in any disparagement of Dr. Talbot, but merely as indicative of the vague notions held in relation to jumping the bite.

The discussion of the paper was not published in the DENTAL COSMOS, but may be found in the Transactions of the Dental Society of the State of New York in the volume for 1892. In the course of this discussion Dr. Farrar said (page 96), ". . . There are two kinds of jumping the bite. When a central incisor rests inside of the lower arch, we place upon the lower teeth an inclined plane to set the teeth out. That is one kind of jumping the bite, but it is not the kind the essayist speaks of." This quotation also is introduced to show that another high authority in orthodontia had a confused idea of the meaning of the phrase, because the operation which he describes cannot be called jumping the bite at all.

Dr. Talbot having read his paper in May, does not seem to have altered his mind about jumping the bite "forward or backward" until perhaps when reading proof of his article, which was not published until October, for in the same volume of the DENTAL COSMOS, in the July issue, he writes as follows (page 550):

"It will be observed that I make the statement that 'I have never been able to jump the bite (by the forward or backward movement of the condyles in the glenoid cavity the distance of the width of a bicuspid and a new socket formed). I do not believe any one else has been able to accomplish it, nor do I believe that such a thing is possible.' It will also be observed that Dr. Kingsley says, 'It has been done repeatedly by me for more than twenty years.' Now, the question arises, Can it be accomplished or not? It is important from a scientific as well as a practical standpoint. Let us have the facts. In order that this point may be settled, I hereby offer one hundred dollars as a forfeit to Dr. Kingsley or any other dentist who will successfully accomplish this operation. A committee of three shall be appointed in the city or town where the operation is to be performed, consisting of two dentists and one physician of noted ability and standing; one to be appointed by the operator, one by me, and the two to appoint the third, who shall examine the patient before the operation and watch its progress until finished. When completed, a full report of the case, signed by the committee of three, with illustration by models (taken and arranged by the committee), shall be sent to the DENTAL COSMOS for publication."

It will be observed that there again he refers to jumping the bite as a "forward or backward movement."

In the discussion of the paper before the New York State Society I am reported to have said, "Dr. Farrar has said that there are two ideas of jumping the bite. There is but one, and the idea that there is more is incorrect. Jumping the bite means only one thing. It means the movement of the whole jaw so that it bites in a new position, and that position must be forward, and not backward. There never has been a bite jumped backward, and there never will be, in my opinion."

This dogmatic statement was honestly made, and was justified by my knowledge and by the records in the literature up to that time. The phrase jumping the bite originated in connection with a forward movement of the whole lower jaw; few men had repeated this operation, and fewer still, if any, up to that time, had reported their accomplishment of this operation. I have been unable to find any such record, though I have not been able to thoroughly search the literature because, prior to 1892, I do not find "jumping the bite" in any topical index. Certainly no one had reported that he had "jumped the bite backward," or, if so, such report had escaped my notice; nor have I found it since. Thus I felt that Dr. Talbot was wrong to speak of jumping the bite backward.

Since that time, however, such an operation has come under my notice, and I take pleasure in recording it, especially as even this accomplishment of that which I so positively asserted would never be done does not refute my idea of its impossibility, since I was mentally contemplating an operation upon a child possessed of part at least of the second set of teeth.

In the interesting case to which I must allude the patient was an infant less than two years of age, if I remember rightly. The child came under the observation of Dr. V. H. Jackson, and he noted that the lower jaw was developing in advance of the upper. He introduced an inclined plane on the upper jaw, and succeeded in forcing the lower jaw back into proper relation. It was a very creditable conception, and its success most gratifying; yet we can still see that the reduction of the lower jaw at that age is quite a different proposition from such an undertaking at a more advanced period of life.

Some time after the publication of Dr. Talbot's unique challenge, Dr. Calvin S. Case published an article in which he alluded to jumping the bite in terms which I saw fit to resent, and I published a somewhat caustic rejoinder, with the result that he replied in even more bitter and scathing language. To this last I did not reply, and I have since heard that Dr. Case was surprised at my silence.

Several years have elapsed, and in writing again on the subject I wish to explain my position in relation to the controversy with Dr. Case. In my reply to his first paper I used language which afterward I regretted, because it seemed to me when reading my words in print that I had made a mistake in injecting personal feeling into what should have been a cold scientific discussion. Dr. Case's sarcastic and bitter rejoinder, while momentarily angering me, also accentuated the feeling that such style of discussion was unscientific as well as undignified, and I determined to delay answering until I might in a measure forget his personal attacks and restrict myself solely to his arguments, which latter did not seem to have refuted my position. About that time I was compelled to submit to an operation for appendicitis, and for many months after I abstained from professional writing of all kind as an unnecessary tax. By the time when I had regained my full vigor I had also decided that science is a patient waiter for the truth, and that it would be quite as well to delay until I might be in the position suggested by Dr. Talbot in his little challenge which I have quoted. It is seven years since he published that, but to-night I am at last enabled to show you the models of a patient as the mouth was at the outset, and the patient herself is here for your examination, that you may decide whether or not it is possible to jump the bite.

In looking over the papers to which I have alluded, I in turn came upon those which were published by Dr. Case and myself, and it had been my intention to make reply to his last. But I found, even after this lapse of time, that his language is so irritating that I closed the book without reading further, preferring to treat the matter from memory rather than to permit any personalities to creep into the present discussion. There is one interesting fact, however, made prominent by the lapse of years. In the *Dental Review* for 1894 Dr. Case says (page 502), ". . . I shall not feel warranted in undertaking the operation of jumping the bite for any patient over fifteen æt., and then it will be with an appliance which can be worn with comfort while permitting the functions of the jaws; one that will absolutely prevent the condyles from taking a more posterior position in their relation to the glenoid fossæ until nature has performed such changes as are necessary to permanently hold them in position. In the discussion at the congress I said I doubted if this were possible. I now have in mind a partially developed scheme which I believe will fulfill the requirement."

Five years have passed, and Dr. Case has not yet published a description of such an apparatus as he had in mind. The above account of his device, in so far as it describes the requirement of an apparatus for jumping the bite, fits very well the Kingsley appliance, a specimen of which I will show, as well as a modification of the original fixture intended for special cases.

What then shall we understand by "jumping the bite"? The phrase was coined by Dr. Kingsley to indicate a specified procedure. Should it have any other application? As I have the story, in the early seventies Dr. Kingsley was describing a case of protrusion which had been corrected with unusual rapidity, presenting the models of the case at a meeting of the Odontological Society. Some one, amazed at the brief time required, asked, "How did you do it?" And Dr. Kingsley, without having previously considered the matter, replied, "Why, I jumped the bite." Subsequently in the paper published in the DENTAL COSMOS for 1878 we find the words in quotation marks.

The operation as performed on the first and all subsequent patients comprised placing an inclined plane upon the upper jaw and within the arch, in such a position that the lower jaw, antagonizing with it, would slide forward to its proper forward position. Observe that I say its proper forward position. My conception of the etiology of these cases is that the lower jaw is behind its proper position. That is, regardless of the deformity in the upper jaw, the lower retreats to a degree which would cause an asymmetry of the external features even were the upper jaw normal. This being true, it is manifest that a reduction of the upper prominence to a close occlusion with the lower, leaving the latter in its retreated pose, would really be carrying the upper incisors back beyond the line required by beauty, and the retreat of the chin would be as marked a disfigurement as ever. On the contrary, if the upper jaw be reduced to normal only, and the lower be brought forward so that the teeth and lips meet comfortably, the best cosmetic result will be attained. This is to be accomplished by jumping the bite, and by no other way.

In deciding therefore whether or not the bite should be jumped, two primary considerations should have weight. First, the external features should be scrutinized to learn whether the forward movement of the lower jaw would beautify the face. This cannot always be decided at a glance. Usually in these cases the upper arch is narrowed so that the two jaws are in good occlusion in the posterior regions, and the forward movement causes an elongation of the bite and a straining of the muscles which would not maintain if the upper jaws were first widened to permit the forward pose of the lower without opening the bite. An approximate idea, however, may easily be had and a decision reached. The second consideration is the relative positions of the teeth of the upper and lower jaws. Where the bite should be jumped, the lower molars and bicuspids will be found occluding back of the proper closure.

In the case which I present to-night (Fig. 1) it was evident at the outset that the upper jaw should be widened, the protrusion reduced, and the bite jumped, as the only means of restoring both the internal and external symmetry. The widening accomplished, the reduction was effected with a gold spring wire, after the method suggested by Dr. Jackson. A plate was made of iridio-platinum (Fig. 2) fitted with clasps about the molars, to which were attached the ends of a wire which came around the front of the arch. This was made of clasp gold, a loop occurring in the region of each cuspid. These loops are closed from time to time, and afford the tension to the front part of the wire which gradually reduces the arch. This method was adopted because the spaces between the teeth offered opportunity for the reduction of the antero-protrusion without much straining upon the anchorage, the plate, however, being relied upon to reduce this strain by giving a bearing against the vault. The correction was readily accomplished, and the retainer was the same plate, with a restraining band around the arch, the plate being fitted with the inclined plane which was intended to jump the bite (Fig. 3). The models (Fig. 4) and examination of the mouth disclose that the end was accomplished.

FIG. 1.

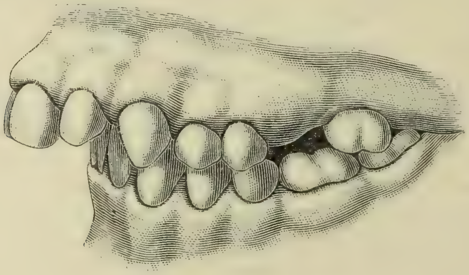
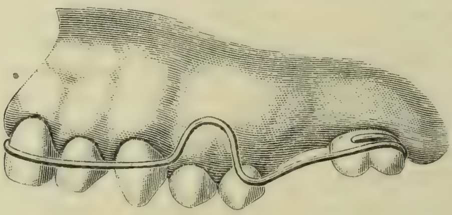


FIG. 2.



There is one feature of this case to which special allusion should be made. In the discussion of Dr. Talbot's paper he advanced the theory that an attempt to move the lower jaw forward would open the bite in the bicuspid region, and he asked those present to make the attempt and see whether a knife-blade could not be passed between the teeth. Dr. Talbot's mistake in that was that he overlooked the fact that before jumping the bite we widen the upper jaw, thus affording opportunity to move the lower jaw forward without opening the bite. Usually this can be accomplished, but it must be confessed that it is not always so; that there are cases where Dr. Talbot's theory holds, even though the upper jaw be widened. This case which I present was, in a limited degree, of this class. The pose of the molars was such that in sliding the lower jaw forward the bite opened slightly in the bicuspid region.

FIG. 3.

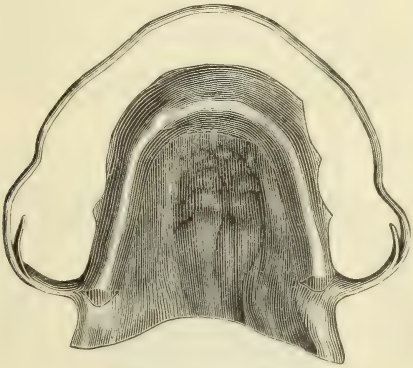
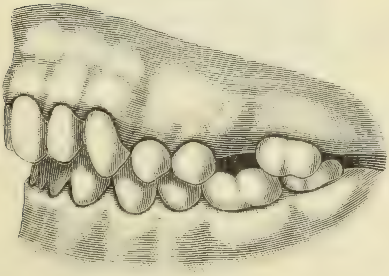


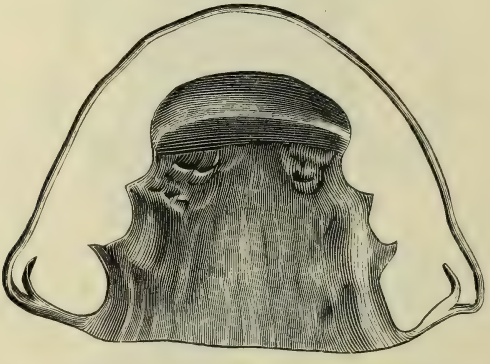
FIG. 4.



Yet observe that two years later the bite is absolute, the bicuspids having elongated to meet the occlusion. It is also noteworthy that this eruption of the bicuspids has relieved the lower jaw of the apparent elongation of the lower incisors, so common in these cases. I have at times thought that this elongated appearance of the lower incisors, in cases of upper protrusion, might be due to the fact that the lower teeth erupted abnormally because of the absence of contact with the upper jaw until the gum itself was reached, as is often the case. Yet this theory is not so good if we reflect that the lower incisors erupt first, and often are in position before the upper have grown to an antagonism with them; and, furthermore, it is not an invariable rule that in prognathous cases the lower incisors reach occlusion with the soft tissues above. Is there anything then in the following theory? Reflecting that the bicuspids appear after the protrusion is well developed, may it not be true, in some individuals, that the bicuspids reach occlusion before full eruption, in which case, when the bite is jumped, with a result of opening the bite in these localities, do we not afford opportunity for the continued eruption of these teeth, which come up bringing the alveolus along with them, thus accounting for the fact that they do not appear to be longer, even when they finally occlude?

The original device of Dr. Kingsley conceived an inclined plane in the incisor region only. As, in such case as was alluded to by Dr. Farrar in the quotation from him, we sometimes place an inclined plane on the lower jaw with the purpose of forcing the upper incisors forward, it may well be asked why the reverse would not be true; why should not an inclined plane on the upper jaw force the lower incisors forward rather than the whole jaw? Force operates in the line of least resistance. Commonly the jaw will yield sooner than the teeth. The great difference between the two apparently similar conditions is this: In the first proposition the teeth to be moved are in the upper or motionless jaw, while the inclined plane is upon the lower or movable jaw. The upper teeth must move out, provided, of course, the child closes often enough and with sufficient force. In jumping the bite the inclined plane is on the upper or motionless jaw, and the yielding must be in the other jaw or in the teeth.

FIG. 5.



As I have said, usually the jaw will yield and assume the new pose. But there are exceptions. In children of sixteen or older the habit of closure may be so firmly fixed that the jaw persists in attempting to reach the false or backward pose, with the result that the lower incisors are forced outward. Again, in very young children, let us say prior to the eleventh year, the incisors may be so loosely fixed in their sockets that they yield to very slight pressure. In either of these cases the remedy lies in extending the inclined plane around the arch (Fig. 5) so that it engages all the teeth of the lower jaw. Thus no undue strain is exerted against the incisors, and consequently the jaw is moved.

In closing I desire to make plain my purpose to-night. Dr. Talbot suggested that a case of jumping the bite should be submitted to a committee of three who should report as to the result. It is not easy to find a patient who would consent to appear before a body of scientific men, and I did not imagine until quite recently that such a request would be granted. Consequently the case presented to-night was completed before I thought of showing the patient personally. However, I assure you the models of the original case are accurate, and ask that in the interest of truth in science those who have examined the mouth and models will, during the discussion, express an opinion as to the result, remembering that it is about one year and a half since the appliance for jumping the bite was introduced.

THE ARTISTIC REPRODUCTION OF THE NATURAL TEETH IN PORCELAIN.

BY NORMAN S. ESSIG, D.D.S., PHILADELPHIA, PA.

THERE is probably no one feature or department of prosthetic dentistry which has been so neglected or lightly dwelt upon as the exact imitation and reproduction of the natural teeth in partial dentures.

It is a well-known fact that an imitation always suffers by contrast with the original. Therefore we should at all times expend our best skill and energy to duplicate that object, and especially so when it is as important and prominent a factor as the teeth.

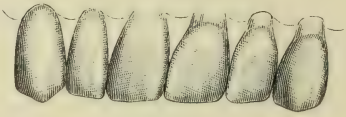
Porcelain teeth, as we find them in the dental depots, are, with few exceptions, such as would ordinarily be found in the mouth of the young adult, and therefore, unless somewhat modified to suit the case in hand, would proclaim the fact that they are artificial. We could not, of course, expect to find teeth which would duplicate the natural ones in every instance that comes to our immediate notice, and it therefore rests with the practitioner to bring to bear his skill and artistic ability to reproduce these teeth, which are so important not only as organs of mastication, but one of the most prominent features of the face.

Let us compare the teeth of a young man or woman of twenty-one with those of a person of fifty, and notice the difference. One is, in the normal mouth, fully developed, showing but the portion of the tooth that is covered with enamel; again, there are no signs of wear at the cutting-edges, while in the other the dentin in many cases is plainly visible above the line of enamel, and the edges are worn to either a marked degree of regularity or irregularity. This is the stage where the artificial denture is generally needed, except in cases of earlier loss due to accident. It is therefore obvious that if we place in the mouth of an elderly person the teeth of the young adult we merely fill the vacant space, but do not improve the appearance of the mouth.

In many cases when there has been marked recession of the gum, a denture having such teeth as are shown in Fig. 1 would not improve appearances in the least, although they would restore lost masticatory surface. This, however, should not be the only thought to claim the attention of the prosthetic dentist; the artistic features of the case are important to the same extent as its general usefulness.

Every practitioner has at his disposal the means of displaying artistic skill, and has opportunity to do so in every case that offers itself to him. There are thousands of porcelain teeth to be had of every conceivable shade and color, and but little time and taste is required to render the detection of an artificial denture almost impossible.

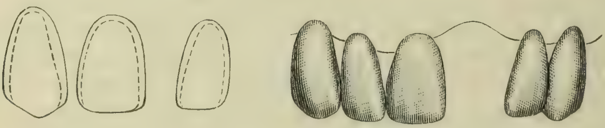
FIG. 1.



These are the points which have been neglected with but few exceptions, and, while we have many prosthetic dentists at the present time who are capable of producing beautiful work, comparatively few of them have directed their efforts to the close imitation of the natural organs.

The method the writer has adopted in such cases is to select a tooth that is larger than is required, but of the desired shade, and with a corundum wheel grind the porcelain tooth carefully, following the character of those on the plaster model until the imitation is exact; then, having previously noted any peculiarity in color or formation of enamel, these features are reproduced by means of paints or stains used for porcelain and the low-fusing bodies generally used for inlays and porcelain crowns. Where the natural teeth have a constricted neck or are much elongated, the line of demarcation between the enamel and the dentin is quite distinct, and this condition, together with the discoloration due to the use of tobacco and other causes, may be perfectly imitated by the paints and bodies.

FIG. 2.



This practice is not by any means confined to the partial denture, but can be brought into use in entire dentures with the same satisfactory results.

Crowns set on roots afford the same opportunities for artistic skill as to position, general character, contour, and natural peculiarities as do teeth of removable dentures.

A porcelain tooth, though it be an exact reproduction in form and color, never has the same texture, if the glaze is allowed to remain as it comes from the muffle, as the enamel or dentin, which has the soft, satin-like surface of ivory or bone; therefore, to produce this effect it is necessary to remove the glazed surface with a fine corundum wheel or hard rubber disk armed with fine corundum. This produces a dead surface which is more or less rough until rendered smooth by either a sand-paper disk or one made of cuttle-fish, which leaves the ivory surface. The portion of the tooth covered with enamel is then polished with a wooden point, with oxid of tin or polishing putty.

The surface obtained in this way may be modified to suit the case in hand, the remaining natural teeth being the guide. At this point it is well to remember that neither the porcelain paints nor the bodies will give satisfactory results if exposed to too great heat, or kept at the fusing point longer than is necessary. Therefore, care should be taken to remove them from the furnace at the proper time, or the color will be burned out and the teeth will remain unchanged.

FIG. 3.

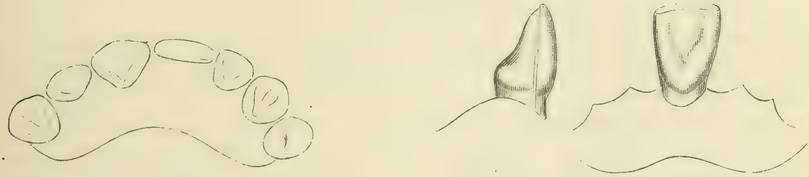


FIG. 4.

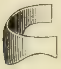
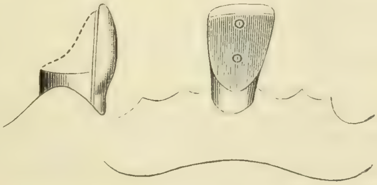


FIG. 5.



It is also well to make a trial burning of the coloring agents used on a porcelain surface before they are applied to a practical case, so as to render the operator familiar with the results, owing to the fact that some shades are very different after burning.

The gas furnaces such as the Downie will probably be found to give the best and quickest results, as the heat can be quickly controlled and the desired shade easily obtained.

In partial dentures the backing of the teeth should also claim our attention; not only from an artistic standpoint, but as regards the comfort of the patient and facility in cleansing the piece. The natural teeth on the surfaces presented to the tongue are rounded, and were not only intended by nature not to offend and irritate the tongue, but to prevent the lodgment of masses of food, which is likely to take place if a single artificial tooth having a perfectly flat backing is placed between two natural teeth. Therefore, if the same care is expended in imitating the natural teeth upon their lingual surface as upon the labial aspect, the results will be infinitely more comfortable to the patient and much more readily kept free from the lodgment of food (Fig. 3).

Where it is intended to reproduce the lingual surface of a tooth by means of thickening the backing, a satisfactory method is to cut a piece of 18 k. gold of No. 24 gauge to the desired height and bend it in a semicircular form, so that the two ends when placed against the backing will give the same circumference as the adjoining natural tooth (Figs. 4 and 5).

The semicircular piece of gold should be cut to fit the irregularities of the plate, and will present a cup or pocket which, when filled with solder, will afford material sufficient to grind to the desired size, thus imitating the portion of the natural tooth which comes in contact with the tongue.

SOME THOUGHTS ON ORTHODONTIA. AN ANSWER.

BY DR. THOMAS B. MERCER, MINNEAPOLIS, MINN.

To corrupt a line attributed to the "Bard of Avon," "That man that hath no opinion, I say is no man." A rational, conservative view on any topic, whether it be a deduction of his own mind or a reflection from another's, is always welcome, and must always invite a certain amount of respect; because he at once becomes sponsor for this opinion, and must expect to meet all would-be challengers.

As a challenger, then, exception is herewith taken to a few of the points brought out in "Some Thoughts on Orthodontia," December *Items of Interest.*

The article suggests to me a boundless faith in one particular authority; at least its influence is apparent in his methods of procedure.

On page 882 he says, "I feel constrained to believe that most of it [irregularity] is purely hereditary." The Egyptians and Jews are then quoted as examples whose "racial characteristics have remained almost unchanged through ages."

The mechanical influence is quite ignored.

Much of either egotism or bravery is necessary for one to stand up and take exception to so obscure a science as heredity in this direction; in fact, the tendency is toward taking refuge in its darkness. But I firmly believe that the more we investigate along this line the more we will find how misplaced has been the responsibility. To be sure, there are two sides to the question, but the element of speculation exists in both, so it is extremely difficult to disprove on the one hand or verify on the other. However, I have a few puny, perhaps trite, arguments in support of the theory that heredity as a factor in irregularity is an overestimated and misconstrued quantity.

The most casual thinker will certainly admit that there is nothing in the organization of the Jewish or Egyptian child that would preclude the possibility of it becoming a mouth-breather, a thumb- or tongue-sucker, a lip-biter, or a victim of abnormal lip-function, the same as other children, and be subject to the same natural consequences; nor does it seem probable that either race has at any time included many dentists of the ultra-conscientious type who would hesitate to extract because of its later evil influence. The vicious consequences of premature extraction in a child of pure blood would certainly be as apparent as in one of irregular lineage.

Any orthodontist will acknowledge that seven-eighths of the cases that come under his observation can be traced to, or show the mechanical influence of, some one or more of the foregoing causes. Why, then, should the Egyptian or Jewish child escape?

If we accept the questionable hypothesis of the transmission of acquired faculties, how have the racial characteristics been maintained?

One of the most complex cases I have yet seen was that of a Jewess.

The result of advanced civilization is also cited. I would ask, then, if that portion of a race that yields to the influence of civilization will not necessarily become the very head and front of this people physically, morally, and mentally? On that theory they are also the most subject to malocclusion.

It would hardly seem, then, as though we could attach absolute faith to the result of measuring thousands of jaws of this people *generally* to verify the idea, because of the extreme likelihood that the material at hand will not represent the class most apt to be afflicted.

The law of the ultimate disposition of the fittest always has, and always will, hold good.

In this connection I wish to quote from one of the current textbooks on orthodontia: "When one parent possesses a large frame, with full-sized teeth set in large jaws, and the other a small frame, with correspondingly small jaws and small teeth, the child may inherit the large teeth of one parent and the small jaws of the other."

After much investigation, I am unable to reconcile this view with the teachings of embryology or with heredity as set forth by Galton, Weissmann, or even Darwin; in fact, I am led to believe that such is not the case.

There certainly must be a consistent law of transmission, as, for example, paired structure. We don't have one brown eye and one blue. In further proof of this outside of paired structure, we don't have the small feet of the female and the large hand of the male represented in the same normal being. The teeth and jaws are the product of the same embryonic layer, the mesoderm (except enamel, which obviously does not determine the size of the teeth); they are therefore very intimately related. If then, as it seems, there is a consistent law of transmission, does it seem probable to suppose that a tendency to inherit scant distribution of structure in the jaws would be transmitted from one side of the family and a tendency toward extravagant distribution in the teeth from the other?

There are also many heritages that come from one side of the family to the exclusion of the other; for instance, if one progenitor is dark-eyed, with a like family history, and the other is light-eyed, with a supporting family history, the tendency of the offspring is not toward intermediate or blended tints, but to take one or the other.

I believe that in structure so intimately related as the jaws and dentin this same tendency will hold good.

It has probably been noticed that reference to the immediate progenitors, without considering family influence, has been avoided, for this reason:* "It appears that there is no direct hereditary relation between the personal parents and the personal child, except perhaps through little-known channels of secondary importance; but that the main line of hereditary connection unites the sets of elements out of which the personal parents had been evolved with the set out of which the personal child was evolved."

Suppose for a moment it be granted that irregularities may be caused by the transmission of the small jaw of one progenitor and the large teeth of the other, according to the foregoing standard authority, the immediate parents would have very little direct influence unless this same relative disparity had existed before them. The union of two widely differing individuals physically can hardly with one fell swoop establish a type, because necessarily more or less of a process of evolution must be undergone. The ovary of the mother is as old as the mother herself; it was developed in her own embryonic state. The ova it contains in her adult life were actually or potentially present before she was born, or grew as she grew. There is more reason to look on them as collateral with the mother than as parts of the mother.

How, then, can a child have transmitted from its immediate progenitors the small jaw of one and large teeth of the other?

Again, suppose for argument that from this cause a child was delegated to acquire any irregularity, why should it be so vicious and unseemly as to wait over until the permanent teeth erupt and not manifest itself at all during the life of the deciduous teeth? (Cases of irregularity of the deciduous teeth being rare indeed.) It is true, of course, that the jaws are only partially developed at that time, but nevertheless much the same relative proportion exists.

Some small amount of correspondence with histologists, embryologists, and biologists on this point reveals a singular concurrence in the opinion that is best expressed in the following quotation from a letter of one of them: "I can see no reason why, if the child inherited teeth and jaws from different parents, the irregularity should not appear as much in one set of teeth as the other."

Are irregularities of the teeth transmitted?

A current text-book contains the following statement: "When the irregularity is known to have been acquired in the parent of the child, and thus to have been transmitted but once, the difficulties in the case are not so marked because the type has scarcely been confirmed."

The author assumes, it has been noticed, that acquired characters can be transmitted; then goes on to elucidate the case. This, to say the least, is unwarranted and misleading; the scientific world is and has been for years poised in doubt on this question.

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*Galton.

Weissmann says, "The inheritance of acquired characters has never been proved either by means of direct observation or experiment."

Galton says, "I am unprepared to say more than a few words on this obscure, unsettled, and much-discussed subject of the possibility of transmitting acquired faculties."

Darwin himself admits that his well-known hypothesis was provisional, but necessary to explain his development of species.

Professor Conklin, of the University of Pennsylvania, has an article in the *Philadelphia Medical Journal* (September 16, 1899), entitled "Phenomena and Mechanism of Inheritance," that touches upon this question in no uncertain manner. It is splendidly concise, and seems splendidly consistent. The last few lines are in the nature of a climax: "The inheritance of acquired characteristics is inconceivable, because the egg is a cell and not an adult organism; and in this case there is no sufficient evidence that the thing which is inconceivable really does happen."

As to the transmission of irregularity, the following little argument would also seem to have some force: "The temporary teeth are rarely found other than in their normal relation. On the best authority it seems that there is no difference in the process of formation in the two sets, and also that the permanent teeth are developed from an extension into the depth from the original connection between the enamel-organ (temporary set) and the epithelium of the surface of the gum." If, as it appears, both sets come from the same source, how can one set be normal and the next abnormal unless it be brought about by external means?

But to return to the article in question. In the next paragraph the word extract is surprisingly frequent. Why extract at all except from dental cause? If the lateral incisors are erupting in lingual occlusion (inferior maxilla), why not with a piece of "G" wire inserted between the temporary cuspids, and pinched every few days, gently widen the arch with no inconvenience to the little patient? If extraction, however, is resorted to, all right, but with band and spur *preserve the space.*

On page 885 is the first of a series of engravings showing the progress and eventual completion of a case. The lower arch, I take it, the author deems a scant factor, for there is no consideration given it whatever in its relation to the upper; no disclosure as to the treatment accorded (for there certainly was a bunching and overlapping), nor is there a single engraving of it in the series. We are therefore deprived of any reliable means of diagnosis; but it has the appearance of coming under Class I (Angle), in which the relative position of the jaws mesio-distally is normal; the first molars also being in normal occlusion.

Fig. 4 shows that the upper right first bicuspid has been sacrificed, but he does not account for such action in any way. If the facial lines indicated such a move it was of course justifiable, but there is no mention of facial lines except where he says the little girl has a "decided hatchet-faced appearance," and that certainly argues against the advisability of it. On the contrary, if the occlusion disclosed the fact that it came under the subdivision of Division 2, Class 2 (Angle),—viz, unilateral distal occlusion,—extraction was perhaps necessary; but it would be interesting to know if the corresponding lower right first bicuspid was also sacrificed.

The appliances shown and the engraving following certainly indicate most efficient work, but it would seem as though photographic reproductions would be more satisfactory to all concerned, because of the surprising progeny of one Thomas by name and erstwhile doubter.

The question of retention, surely a vital issue, is not touched upon; but if the lower arch has been left uncorrected as I am perhaps wrong in assuming, it is not exactly clear to one who accepts occlusion as a basic principle what means will be employed to permanently insure their position.

Perhaps the author assumes that the answers to many of my questions are self-evident, but to me a scientific article at its very best is always more or less obscure; and there can never be too much detail in the description of a mechanical operation.

AMALGAMS.

BY J. FOSTER FLAGG, D.D.S., SWARTHMORE, PA.

THAT I should be writing an article upon amalgams may seem to others, as it does to me, peculiar, in that I have already written so much about them; but until my resignation from the Philadelphia Dental College, some four years since, I had such opportunity to *talk* them that further writing of them appeared unnecessary; but so much is being done with them now, so many papers about them and their working are being contributed to our societies, and so much consequent discussion is being indulged in, that these, together with the extraordinary and questionable claims as to attributes, and more than usually curious lists of "testimonials" which are being presented to "the profession," are my warrant for this contribution.

In addition to this, I have already replied to many letters of inquiry, and am in receipt of so many more yet unanswered, but which evidence an encouraging interest, and in some cases misconceptions that seem too general, that I think I can make one reply more serviceable than many.

In regard to the making of amalgam alloys I have for twenty years demonstrated that it was a comparatively easy thing to do; that it needed but little in the way of apparatus and appliances, and have had the satisfaction of thus far helping many a student to such practical knowledge of that department of dentistry.

My experience of these many years has taught me, as I have taught, that several kinds of amalgam are essential to the proper utilization of that material; that of all these that line which has been called in "New Departure" nomenclature "sub-marines," and in laboratory parlance "bronze alloys," from the fact that alloys of copper and tin are utilized for the facile incorporation of the copper, are the most positively *useful,* because they had been proven capable of saving a class of teeth which *no other material has saved,* and that this *saving* seemed almost limitless, as dreadfully decayed and miserably structured teeth had been saved by the thousands for periods varying from ten to thirty, and even forty, years.

No one can say that no other amalgam *can* do this, *but no other amalgams have done it.*

The *peculiar attribute* of all "sub-marine" amalgams is their property of *sulfiding* when exigencies demand it, and apparently of doing this *in proportion* as this demand is made upon them; so that while in some dentures a given demand causes a brown discoloration of greater or less intensity, in others a greater demand causes an almost immediate discoloration to the blackness of jet.

These results are due to combinations of silver and copper; in most cases more or less controlled by tin, but in cases of absolute necessity of either copper alone or of silver and copper only. This leaves *copper* as the *distinctive* metal for sub-marine amalgam alloys, as *all* dental amalgam alloys contain silver.

A very gradual increase of copper now gives the formula for "sub-marine" alloy as silver, 60; tin, 33; copper, 7.

The next class of amalgam is "contour," or "usual," the alloys for which I compose of silver, tin, *gold* as their *distinctive* metal, and zinc, in the varying proportions of from 60 to 70 silver, from 25 to 35 tin, from 1 to 3 gold, and from 1 to 3 zinc.

This kind of amalgam has done most acceptable service for twenty-five years; its formulæ were "accepted" with much deliberation, and only after years of clinical trial of each modification. Its grain is good; it mixes easily with its mercury; it gives ample time for comfortable manipulation, and by "wafering" it is made to set with satisfactory celerity. Its maintenance of color is good when left with that "mat" finish which nearly approximates the color of a tooth, and if it discolors it is usually permanently restored by pumicing and burnishing. But its greatest merit is its reliability; upon that the testimony of years gives no discount.

The third class of amalgam is that known as "facing," or "white," a most desirable amalgam *for its purposes,* and which has zinc for its *distinguishing* metal.

Commencing twenty-five years ago with the formula of tin, 50 odd; silver, 30 odd; gold, 5 to 7; zinc, 2 to 4, it was at first used either alone or in combination with "contour" as a means for increasing the maintenance of color, and thus giving a degree of beauty as well as utility to the then growing frequency of amalgam filling; but as years passed the tin was increased to 55, the silver to 40; the gold was abandoned as non-compensating, and the zinc increased definitely to 5.

Meanwhile its value as a reliable covering to arsenical applications when exigencies demanded such for long-continued periods; its adaptability for the filling of tap-holes, when such were regarded desirable in positions subject to attrition; its eminent appropriate-ness for amalgamating gold-coated porcelain inlays and for "cold-soldering" them to the cavity-filling, whether of gold, amalgam, or "combination" work, became so apparent that I do not now know how all these ends can be accomplished without this form of amalgam.

All these amalgams appear to be established as means for certain ends, and there remains but one other class of alloys for consideration. These are the "bastard," or "brass," alloys.

It has been noted that each class of alloys has its *distinctive* metal, used for a special purpose; and, with the exception of gold, this purpose positively assured. But it must also be noted that copper is used mainly for the assuring of discoloration (though incidentally for the control of expansion), while zinc is used for the prevention of discoloration and for the assurance of expansion. Thus copper, as copper, and zinc, as zinc, are diametrically antagonistic the one to the other, and for this reason I have never made such combination.

But by reference to page 50 in the first edition of "Plastics" (1883), it will be seen that as the result of "New Departure" metallurgic work I was early impressed with the alloys of copper and tin as productive of very white results; while in the edition of 1890, page 104, it will be seen that even then ten years of experiment had been given to the problem of a "front tooth" alloy.

By this time I had reached the heavily gold and heavily zinc alloys and had had the experience that though they promised much, the promise was not satisfactorily fulfilled; I had also worked up the alloying of copper with tin, and made some curious results which are given on page 104a. I next tried the "mechanical mix" of copper and zinc as distinct alloys, which work will be found on page 104b, and which gave the most acceptable results reached up to that time.

It was soon decided that even the amalgams obtained from these alloys were by no means such as were desired, but they had given the ideas for the "bastard" or "brass" alloys, in which work I have recognized the results as "bastard" because they can be neither sub-marine, contour, nor facing, and as "brass" because as with copper in the first, gold in the second, and zinc in the third, brass is the *distinctive* ingredient of this fourth class.

If the compounding of alloys of silver, tin, and copper, or of silver, tin, and zinc, is peculiar and very interesting work, the compounding of alloys of copper and tin (bronze) or of copper and zinc (brass) are interesting even to fascination, and when these are in turn compounded with silver and tin, and possibly with gold, the results are *probabilities*, and the *possibilities* are determined only by experiment.

This work is done, not primarily for the purpose of a *tooth-saving* "contour," not for any substitute for the "sub-marine"; not, by any means, to subserve the most desirable purposes of the "facing," but to give an acceptable amalgam for the doing of that "combination" or "composite" work done by "lining" cavities with either zinc phosphate or oxychlorid cement and filling with amalgam, of which we now have the record of *twenty years* as being the nearest *perfection*, as a *tooth-saving* work, and only requiring such an amalgam as is yet not positively *known* to have been made to give it *perfect beauty*.

For such an amalgam we desire an acceptable grain, an ease of mixing, a deliberate though sufficiently prompt setting (that time may be given for careful manipulation and that the setting may admit of a reasonably quick finish), a good degree of resistance to both attrition and pressure; though this attribute is not now a question, for, so far as I have made them, I do not know of any "brass" amalgam that does not possess needless hardness, while some are so hard as to have been undesirably inflictive in their removal (even though softened with mercury in drill-holes) when such removal became necessary.

But beyond all these the *persistent* maintenance of color is *the* attribute without which all the others are of no avail, and this is what I believe is not yet *known* to have been accomplished.

For a long time I have had and taught amalgams which would retain their color—almost always—for several years, but time, "which tries all things," has usually proven too much for even the most promising.

I have, for long, established the rule to give dental experiments (from conservation of pulps to action of filling-material) not less than five years, and under the most possible varied conditions, before coming to even a preliminary, and by no means positive, opinion.

I have repeatedly noted the advantage of this deliberation, and it is this which I regret as likely to debar me from much further experimental research, a work which has been to me a source of great pleasure, and, largely, of comforting satisfaction. As I view it, the obtaining of an amalgam which would *permanently* maintain its white and tooth-like color would give dentistry, for ordinary work (the usual filling of cavities of decay), a material which while it might be better than gold because of the markedly greater facility in its introduction, would nevertheless be but *relatively* only better than gold because of that very retaining of unattacked brightness.

As is well known, I have worked and taught for twenty-five years (a good, long experience) in the faith of the theory of Dr. S. B. Palmer, that "Failure in operations is *mainly* due to incompatibility of filling-material with tooth-bone."

In no other way have I been able to explain the failures of my carefully introduced fillings of gold (and not mine alone, by any means!) and the success of my so much more comfortably introduced fillings of other materials, and I have never believed other than with my friend, Professor Henry Morton, when he said, "Now acid fluids do act chemically on bone, and the presence of a good conductor, *which is itself unattacked*, in contact, must, on general electrical principles, assist the electro-chemical action."

"Unattacked" means ability to maintain integrity, for so long as that condition exists the attacking force is a *nothing* to it, but just inversely the other element in the fray suffers, and *therefore,* "in proportion as a tooth *needs* saving," an amalgam which maintains its color would, *alone,* be the worst amalgam to fill it with.

But "life" is not everlasting, and even the permanent teeth are not intended to last a lifetime, as many do not erupt until from a sixth to a quarter of the average length of life is passed, so that it may be, according to the table of electrical conductivity, that a bright amalgam filling will save a tooth twice or thrice as long as a bright gold one; and if such is proven, by time, to be true, then surely we will have approximated the "ideal" filling-material, and those who think that filling with gold can alone keep dentistry up to its high standard of manipulative ability must look for other means, as they will find "Othello's occupation gone!"

PORCELAIN DENTAL WORK.

BY DR. J. B. ERNSMERE, BUFFALO, N. Y.

(Read before the Union Meeting in Rochester, October 24, 1899.)

INLAYS made of pulverized glass were advocated by Herbst in the year 1882. The method was to take an impression of the cavity in wax and make two molds in a mixture of plaster and asbestos. A quantity of the prepared glass was placed in the first mold and fused. There was always a good deal of shrinkage. The inlay was then placed in the second mold, more glass was added, and the whole again melted. The inlay thus prepared was adjusted to the cavity, the surface excess trimmed off, then cemented in place, and at a second sitting dressed smooth and polished.

Even in this crude way of making the inlay the results were not altogether unsatisfactory. There was merit in the idea, and it was not long before there were numerous experimenters in this field. The need of a better method of securing a mold of the cavity soon became apparent,—a method which would give clearly-defined edges, that would be retained in the process of fusing. In 1887 Dr. C. H. Land made this possible by devising the metal matrix. In his method the cavity is prepared free from undercuts, and then a piece of platinum foil is laid upon it and burnished into it, so as to afford a mold of its shape in every particular. The absence of undercuts in the cavity permits the matrix to be readily withdrawn. In the mold or matrix thus obtained porcelain body is placed and fused in a furnace. Usually two fusings are necessary, a little additional body being added after the first to allow for shrinkage. The platinum foil can readily be peeled or stripped off from the inlay after it has cooled. It is then adjusted to the cavity, cemented in place, and dressed off and polished at a subsequent sitting.

In beginning his work on porcelain inlays Dr. Land tried gold foil for the matrix, but abandoned it in favor of platinum. He found that gold foil would not stand the heat required to fuse high-grade porcelain. Gold, however, is so much more pliable and tractable than platinum, and therefore so much better adapted in these qualities for use as a matrix, that he did not abandon it until he had tried to devise a porcelain body which could be fused in it, and which would in all other ways answer the purpose as an inlay material. It was not difficult to make a low-fusing porcelain body, but he found it impossible to make it such that it would have the texture, strength, color, and permanency of the high-grade porcelain body. No one has yet succeeded in doing what he failed to accomplish, unless it be that the "porcelain enamel" recently devised and advocated by Dr. N. S. Jenkins, of Dresden, shall fill the requirements. I have not yet tried it, but shall do so soon.

The low-fusing bodies heretofore devised have all contained too much borax and pulverized glass, and therefore are prone to deteriorate in use in the mouth.

With the platinum matrix no investment is required, and after the first fusing it can be burnished into the cavity and the fit and color noted and corrected if necessary. This is often a very important advantage. Then, too, with the platinum matrix a high-grade porcelain material can be used which has undoubted strength and permanency, and which maintains its color unalterably in fusing.

In selecting the color care must be taken to do so with the tooth in its natural moist condition, and not when it has been dried out under the rubber dam or napkin or cotton roll. If the color cannot be matched exactly it is better to have the inlay a trifle darker, rather than lighter than the tooth, except in an approximal cavity, where some allowance must be made for shadow. In a small approximal cavity it will generally be found best to have the inlay a trifle lighter than the tooth.

In my hands porcelain inlays have a rather limited range of usefulness, being restricted to easily accessible cavities. They are particularly useful in labial cavities in the incisors and cuspids. If gold could be used as a matrix I think their range of usefulness could be considerably extended.

In shaping the cavity for the matrix, it should be made not only free from undercuts, but also slightly wider at the outlet than at the bottom, so that the inlay will be wedge-like in form. When the platinum foil is stripped off the inlay will enter the cavity to a corresponding depth and make an exceedingly close joint at the margins.

In burnishing the platinum foil into the cavity I use little balls of cotton, pressing them down with an instrument, and finish with some hard wax. The wax keeps the matrix from getting out of shape in removing it from the cavity. It does not matter if the matrix should become perforated or slightly torn at the bottom, if only the margins are perfect.

In adjusting the inlay to the cavity it is often convenient to facilitate handling it to put a little sticky wax on its outer surface. It can then be carried into the cavity and withdrawn on the point of an instrument. One word about mixing the porcelain body: It is generally preferable to mix it with absolute alcohol. The alcohol evaporates quicker than water, and with less liability of bubbles or blow-holes; besides which, water may contain in solution something which may affect the color of the inlay.

The cement used should be slow-setting, and of a color to match the color of the inlay if possible. It should be mixed thin, and the inlay should be pressed firmly into the cavity and held there until the cement has crystallized. In the crystallization of the cement there is a slight expansion, and if the inlay be not held firmly in place there will be open margins.

I now wish to speak of porcelain in crown-work. I have used the Downie crown a good deal, and with entirely satisfactory results. This is made the same as a Richmond crown in the matter of the cap and band, excepting that gold-faced platinum is used and soldered with pure gold. The post or pin is made larger, so as to allow it to project well through the cap. Around this the pins of the porcelain facing are bent after the latter has been ground to fit. Porcelain body is mixed and placed on the palatal or lingual surface of the crown and fused in the furnace. Two bakings are necessary,—the first to biscuit the body, and the second to finish.

There is also the Land crown, in which a platinum jacket is fitted on the tooth suitably prepared to receive it. On this is laid some porcelain body, and a porcelain veneer of proper size and color. The jacket and veneer are then removed from the tooth and placed in the furnace. After cooling, the crown is ready to be cemented on the tooth.

I occasionally have converted a Logan crown into a crown with cap and band by the use of the furnace. This is not at all difficult.

I also make use of the furnace when I wish to alter the size or shape of a Logan crown, in order to make it fit more perfectly the root of the tooth. Also the repair of sections or plain teeth from which the pins are broken.

I have not made any porcelain bridge-work, because I knew no way of repairing it in case it got broken except to remove the whole piece. That would be troublesome alike to patient and dentist.

I am using a Downie furnace, as I find it effective, and as good as any gas furnace. It has a platinum muffle, and the work can be examined or removed without having to cool the furnace.

COMPRESSED AIR IN DENTISTRY.

BY DR. W. H. POVALL, MT. MORRIS, N. Y.

(Read before the Union Meeting in Rochester, October 24, 1899.)

In presenting the subject of compressed air in dentistry I lay no claim whatsoever to originality; the many uses have been suggested to me at various times by different experimenters. At first thought the matter presents itself in the form of a luxury easily dispensed with, and, while the large percentage of the profession do without it, yet a trial convinces the busy man that the benefit he derives from the ordinary chip-blower is augmented a hundredfold by air under fairly heavy pressure and in good quantity.

The tendency to-day in the introduction of new methods is to get something whose complexity is a bar to its general use. Cataphoresis was all right, but I think you will admit that the time required for its proper use was a factor leading to its gradual disuse. And so, again, with various compounds intended to allay hypersensitivity. They all require time; so much so that the ordinary practitioner is tempted to believe that, after all, humane dentistry is a delusion, or at least has its place only in certain offices.

In the June, 1899, DENTAL COSMOS Dr. Morton, of New York, discusses the question of pressure anesthesia from a scientific and, to him perhaps, a practical standpoint. You will remember he advises placing a cocain solution in the cavity, and then ligating a thin rubber tube over the tooth. The air pressure is attached to this, and after an application of on the average of five minutes the cavity can be painlessly prepared. You readily see the whole scheme is too elaborate for most of us. It is limited in many ways, and I doubt that the resulting exemption from pain in excavating would repay the time and patience required to make the application.

We are all anxious to perform our operations in as humane a manner as possible; we only want the means to be likewise humane in its effect upon the operator.

As to our first application of compressed air, we will instinctively recall its use as an aid to the preparation of sensitive cavities. The chip syringe is the first and primitive method for the administration of air under pressure, and from its use you have ofttimes been satisfied that you have reached the very climax of tooth-anesthesia. The philosophy of this plan is too well known to require me to dilate upon it. The trouble with a chip syringe is you have not a steady current; either your air is too hot or not hot enough, and the sudden blasts are of themselves a disturber to the patient's nerves. It is again hard to control; the pressure upon the bulb is quite liable to send the air where it is not needed, or to bring the hot instrument against the dam or mucous membrane. I find that a warm current of air under twenty-five pounds pressure will in a moment or two so rid the tubule of moisture that it can be cut with sharp instruments as near painlessly as is ever necessary.

I use an S. S. White syringe, No. 30, fitted to a Boekel cut-off. The carbon plug can be heated very hot, but with the air at good pressure I have never found that it ever gets uncomfortably warm, and I believe here lies the secret of success. We have been using our air either too hot or too cold, and as a result the application itself is painful.

As dryness progresses we have, of course, the slight ache, which is easily remedied by almost any application. I believe the majority of our profession pin their faith to dryness as the remedy for pain, and I am confident if air were once used in the larger quantity proprietary obtundents would have a very small sale.

Those of us who are not privileged to select our practice find compressed air a pleasant adjunct in another way. We are called upon to clean teeth almost as a man sends his soiled linen to the laundry. The *débris* and green-stain at the neck is enough to make one almost change his occupation. But here we use a tube containing about an ounce of peroxid, full strength. A pressure of air full twenty-five or thirty pounds will so divide this solution, sending it in every nook and corner, that what has taken half an hour to remove will melt away as by magic. The common atomizer will not do; it lacks force, and I believe this force is a mighty factor in removing the various stains. In this connection also comes the treatment of pyorrhea. The air current has been used, and is recommended by many users, to force the gum back that a clear field may be obtained in the scaling process, and afterward to carry the medicaments to the remotest pus-pocket.

Dr. Register, of Philadelphia, has unbounded confidence in antiseptic solutions under pressure in the treatment of this disease. He reports his own teeth as being given up for lost in 1887, and being so loose at that time that their removal with the fingers would have been easy. He resorted to systematic treating with mild antiseptic solutions, forcing it under the gum-margins, and as a result his teeth have been a source of comfort to him through over twenty years. You will admit that one trouble in the treatment of this disease is the getting at the diseased parts, but this is simplified by our use of compressed air.

Another little matter that almost alone repays the installing of an air plant: It is the custom of many operators after inserting a cement filling to coat it with paraffin or varnish and allow patient to return for the polishing. The object of this, as you know, is to allow the filling to harden. This extra sitting is done away with through the aid of warm air. But here again the ordinary syringe is of little use; you cannot keep what little air you have at a comfortable degree of heat for a moment at a time. I find that a cement inserted at the ordinary consistence can be hardened within five minutes so that strips and disks cut it as though it were gold. As to the effect of heat upon cement, I have the word of a member of this society, who uses cement in the construction of a Richmond crown, that heat sufficient to flow 20 k. solder has no effect save to so harden the cement that it is almost impossible to cut it.

There are many other points that you can all see in connection with this subject. The desiccation of the contents of a putrescent canal lessens one-half the liability of forcing the contents through the foramen in the opening up process. The subsequent drying and filling these canals. The drying and keeping dry of an abutment for crown or bridge, and in this connection a demonstration of the power of air under twenty-five to thirty pounds pressure is necessary; the mouth can be made and kept uncomfortably dry for any length of time needed for our work. In the banding of a root the blood and gum can be forced back so the enamel can be scaled with comparative ease and comfort.

In all these operations the outlet of air is under the control of the operator; the cut-off controls the supply, and to all practical purposes can be regulated so the pressure will remain even.

A compressed air outfit can be installed for almost any amount of money. All absolutely necessary is the pump, tank, and hand-pieces. Those who have the use of flowing water can have a pump that maintains a fixed pressure at all times; for those lacking this a hand-pump is made. I use the latter, and find that one hundred strokes will give thirty pounds pressure, and this is maintained during a day's operations by a half-moment's working semi-occasionally. It is not at all troublesome to keep the air up if your tank is of good size and the pipes air-tight. In this connection, bargain with your plumber beforehand; if his joints leak air, they must be repaired at his expense; a recess joint that will hold water will not hold air. The larger the tank the better, giving you larger quantity; being once filled will last a long time. This air, of course, can be used in all soldering operations, and its advantage can be readily seen.

As you see, gentlemen, I have nothing new. I do not claim wonders for this application. I simply say what you have used before can be so arranged that under different conditions it will surprise even its most sanguine admirers.

A FEW STATISTICAL FACTS, SHOWING THE NEED OF DENTAL SERVICE IN THE ARMY.

BY CHARLES C. STANLEY, D.D.S., COLUMBIA, S. C.

WHEN the First and Second South Carolina Volunteer Regiments were being organized for the war with Spain, they were stationed in this city, prior to the First Regiment going to permanent camp at Chickamauga and the Second to Jacksonville. The surgeons were not supplied with dental instruments for the extraction of teeth, and, by the authority of the surgeon-general, Captain E. B. Fuller, the mustering officer appointed me to do the extracting necessary for the men of the above regiments. I came in professional contact with about two hundred of the officers and men. I extracted between one hundred and forty and one hundred and fifty teeth, most of which were paid for by the Government, and the rest were paid for by the men, they not having orders from the surgeons to have the extracting done. For several days after pay days I devoted all my time to operative work for these soldiers, they paying for the same, and you can well imagine that out of their small salaries they only had just such work done as required immediate attention.

During my professional relationship with the soldiers, I noticed one case of syphilitic necrosis, two cases of necrosis due to chronic abscessed teeth, six cases of alveolar pyorrhea (none of which had ever received medical attention), three cases of impacted third molars with extensive inflammation, and in two cases suppuration. In all of the above cases I informed the surgeons of the necessity of treatment and what I would have done for the same in my private practice. Out of the two hundred men spoken of, there were seven totally incompetent to masticate their food and a number only partly competent to do so.

The First Rhode Island Regiment and the Second Tennessee Regiment were stationed in Columbia for a short time, and during their stay here I inserted sixty-nine fillings, made five plates, mended three plates, and extracted nineteen teeth, all of this work being paid for by the patients. I am sure that the other nine dentists in this city averaged as much work among the men of the Rhode Island and Tennessee Regiments as myself.

I have written several articles on the need of dentists in the army (published in *Leslie's Weekly, Army and Navy Journal, American Dental Weekly,* etc.), but they were all written before I was as thoroughly acquainted with the subject as I am to-day.

If each dentist would urge the Senators and Representatives for his district to give their generous support to the army dental question, the blessing of proper dental attention to the defenders of our country would be assured.

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CORRESPONDENCE.

REPLY TO DR. HEAD.

To the Editor of the Dental Cosmos:

Sir,—The December number of the Dental Cosmos published a communication from Dr. Joseph Head to which I beg to take exception. The paragraph which is objectionable to me reads as follows:

"The editor of the *Items of Interest* excuses his action by explaining that he made the change because he did not wish to advertise an employe who had left the company which he represents. Such advertising zeal ordinarily does not interest professional men, but when this zeal perverts the accuracy of scientific papers it becomes dangerous."

Dr. Head is evidently one of that class of witnesses for whom the oath was framed which compels that the truth, the whole truth, and nothing but the truth should be told. There is nothing in the communications which have passed between Dr. Head and myself which authorizes the statement here made. Shortly after the appearance of the article he wrote to me complaining of what he called a typographical error, declaring that he "distinctly did not mention the Consolidated Company," etc., to which I replied as follows:

"Dr. Joseph Head, Philadelphia, Pa.

"*My dear Doctor,*—Yours before me is somewhat of a surprise. In it you say, 'I distinctly did not mention the Consolidated Company,' etc.

"The copy of your paper was type-written, and in the type-written original you called the porcelain by its proper name—Consolidated porcelain. You were speaking of the experience that you had had with a certain material. You obtained it from the Consolidated Dental Mfg. Co., and it was their porcelain. Subsequently, you evidently decided to change your manuscript, and you scratched out the original reading, and inserted in pencil the name of Mr. Whitely.

"In publishing I corrected this, just as I should have done had Mr. Whitely still been with the house, as it is not customary either to call things by a name by which they are not known in the open market, nor by the name of the employe of a house for which he works. For example, you would scarcely expect the COSMOS to publish an article relating to their teeth, in which you would call the teeth by the name of the man who has charge of their tooth-factory; consequently, as the error was not typographical, I see no reason for publishing a correction.

"Very truly yours,

"R. OTTOLENGUI."

It will be noted that I do not here excuse my action by explaining that I made the change because I did not wish to advertise an employe who had left the company. I will admit, however, that I have elsewhere made the statement that I published Dr. Head's article in its original language because I was satisfied that the alteration had been made with the intent of procuring an advertisement in our scientific pages.

R. OTTOLENGUI.

NEW YORK, December 31, 1899.

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PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL CLUB OF PARIS.

THE following paper, read by Dr. I. B. DAVENPORT before the American Dental Club of Paris in October, 1899, with the accompanying protest, were voted by the club November 4, 1899, to be sent for publication to leading dental journals of Europe and America:

"DENTINE PLASTIQUE DU DOCTEUR KLEIN."

Mr. President and Gentlemen: During the winter of 1897-98 a man calling himself Dr. Klein, of Buda-Pest, came to Paris to sell his interest in a pulp-capping, which he called "Dentine Plastique du Dr. Klein." He sent around samples to dentists for trial, and a few weeks later called to ask for a testimonial.

During that time he sent to the club for our examination a section of a tooth filled with cement over a capping which rested upon the bottom of the pulp-chamber. This was accompanied by the statement that "this capping and filling had been done in the mouth three years before the tooth had been extracted, the extraction having been done for the scientific purpose of showing the transformation, during the three years' sojourn in the mouth, of the capping-material into organized dentin."

We all examined the section under the microscope, and easily remember the peculiar appearance of the capping.

Soon after, a call from this same gentleman on several members of the club was made to request a testimonial, which was refused; but not long after we all received a circular (which I have brought along) recounting the virtues of the plastic capping and containing an engraving of the sections of tooth sent to us for inspection, with the names of nearly all of us appended to a testimonial in favor of this material.

Nearly all the names on that circular were placed there either directly against a specific refusal to allow their use, or without being asked.

This circular appears to have been published all over the world (it lately appeared in a Mexican dental journal), with our names added against our wish or knowledge, and is helping to sell this stuff, of whose composition we know nothing.

Now, about that piece of tooth sent for us to inspect and this drawing made from the same, which forms part of the circular to which our names are appended, Mr. Dalton can tell you, and has kindly consented to do so.

Mr. Dalton is an expert preparer of objects for microscopical study; his work in the form of "Dalton's gems" is well known.

[Mr. Dalton said: Gentlemen, some time ago a friend brought me a section of a tooth of which a gentleman unknown to me wished a drawing made, showing particularly the appearance of a substance under the filling. This cut in the circular mentioned by the essayist is a reproduction of the drawing made by me, excepting that these heavy lines have been made over my drawing, as if marking it off into little squares; in all other particulars it is as I drew it.

When I examined the section from which the drawing is made I noticed a familiar substance occupying part of the pulp-chamber and supporting the filling. I scratched out a slight fragment, placed it under the microscope, and found it to be, as I first supposed, a section of cuttlefish bone.

I am not a dentist, but when my friend came for the drawing I casually remarked, "That must have been a clever idea, to place a light support of cuttlefish bone to build the filling upon." My friend replied, "Get out with your cuttlefish bone; that is new-formed dentin."

I was greatly surprised, as I supposed he knew its composition. After some difficulty he was convinced, but not until I had shown him, under the microscope, pieces of this capping side by side with pieces cut out of cuttlefish.]

The essayist continued: Gentlemen, from Mr. Dalton's remarks you see the imposition shown in that section of tooth, and in this drawing, which has marked over it in large letters: "Dentine Plastique du Dr. Klein du Buda-Pest. Vue de sa transformation dans la chambre pulpaire après trois années de séjour dans la bouche."*

It seems evident that this device was intended solely to make a favorable impression and facilitate the sale of a product which, if as good as pretended, ought not to need so much misrepresentation. This improper use of our names gives a false impression.

Mr. Dalton then showed under the microscope preparations of cuttlefish bone which were made on the spot.

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*"Dentine Plastique du Docteur Klein du Buda-Pest. View showing its transformation in the pulp-chamber after three years' sojourn in the mouth."

PROTEST.

We, the undersigned, whose names are appended to the affirmation of the success of "Dentine Plastique du Dr. Klein," have never given consent to the use of our names in that connection.

(Signed by J. G. Brigiotti, E. A. Bogue, G. C. Daboll, I. B. Davenport, C. V. Du Bouchet, Chas. Hotz, Theodore W. Evans, J. H. Spaulding, John Evans, J. Michaels, A. Hugenschmidt, John Didsbury, L. Saussine, Geo. Roussel, W. S. Davenport, Henry Didsbury.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, November 14, 1899, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William C. Deane, in the chair.

Dr. DAVID C. BAKER, chairman of the Clinic Committee, announced that arrangements were being made for the holding of a clinic on the day of the December meeting.

Dr. R. OTTOLENGUI read the paper of the evening, entitled "Is it Possible to Jump the Bite?"*

Discussion.

Dr. J. N. FARRAR. I do not know that I can add much to what Dr. Ottolengui has said, because the subject is as yet somewhat hazy, and I might say unsettled in its scientific aspect. "Jumping the bite" is a term first suggested by Dr. N. W. Kingsley. In writing my work, I used the term "jumping the bite" in referring to the operation of carrying one front tooth over another. I call the mere act of carrying it over jumping, while Dr. Kingsley meant it for carrying the lower jaw forward bodily. In regard to this controversy between Drs. Ottolengui, Talbot, and others, I will not now discuss, but simply give my own opinion upon the operation in question. Those who have much to do in regulating teeth often find that the eruption of a tooth (generally the third molar) is such that when closing the jaws the lower teeth sometimes slide forward of their normal place. I remember a dentist, a few years ago, coming to see me with a case of that kind. I put my finger over the joint, and felt the condyles move forward when she closed her mouth. I said to the doctor, "I think the third molar is the cause of the trouble." My advice was to either grind the interfering third molars so that they would not interfere, or extract one or more. I further said, "I think, however, that by simply grinding the teeth so that they will not interfere, the lower jaw will fall into its proper place." I did not again see the case, but afterward the doctor said to me that he followed my advice and there was no more trouble. He might have gone through a longer operation and gained no more than was gained by this short process.

In every case of that kind that comes to me, I first place my finger over the condyloid joint to determine where the trouble lies. In this way we can always find how the condyles act, whether they move forward or not. Whatever the interference may be, it should be disposed of. The question to decide is whether to remove a part or the whole of the third molar or molars, or to go through the larger operation, requiring long time and considerable money. I can generally conquer such cases by the shorter process. In fact, the latter is so short that I seldom make much charge for it. The main question to me is, Which is best for the good of the patient? To do what is best for the patient may of course be a matter of difference of opinion, but I refer only to the judgment of experts.

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*Printed in full at page 143 of the current number.

I take the ground that *the condyle should have its normal play in the sockets.* I think that any operation that depends upon the drawing of the condyle forward of its normal place in the socket is not the best operation. I prefer the operation that places the condyle in its natural home, and then making the operation upon the teeth, with a view of having the condyle remain at home. An operation that would leave the condyle forward of its natural place all the time, I think, is not reliable. To the question, "Can we move the lower jaw forward and permanently hold the condyle in its new position?" I would not say that it is not possible. The essayist's case presented here to-night is evidence that it can be done.

What may be done and what is best to do may be quite different things. The question of money and time is also worthy of consideration. Sometimes we are called upon by patients who are so poor that they cannot afford to have anything done. We are also sometimes called upon by persons who live in the country, where there is no one to do the work. Thus we see that which may be scientifically proper to do in a case in another may be almost impossible to carry out. Circumstances should be our guide.

In Dr. Ottolengui's case I saw the casts and examined the patient, and the operation and results seemed to me to be all right. If I had seen the patient when the operation started, and noticed where the condyles were and how they behaved in their glenoid cavities when the jaw opened and closed, I would have an easier ground for my remarks. I must assume, however, that the condyles were in their proper places, or the operation would not have been attempted. Certainly, the teeth have been moved forward, and they now have a better antagonizing lock than they had before. The question might be asked, Were those lower teeth, *per se,* moved forward, or were they moved by moving the jaw bodily, and, if so, will the child become accustomed to holding the jaw in its new place without conscious effort?

In regard to the subject of the evening, the operation for "jumping of the bite," I do not see how it can be conclusively settled here, as there are so many conditions that require more careful thought and study. While this is a very interesting subject in the abstract, I do not see how it is to be fully considered now. I hope Dr. Ottolengui will continue his studies in this line until he makes all points clear. As the matter seems to me to-night, I would advise young dentists to first obtain the correct location of the condyle, and then get the teeth into their proper positions in the best way. In other words, do whatever the circumstances of the case indicate. Some dentists are good judges, and some are not; one person may say one way is the best, and another one (not so well versed in the subject) may think differently; but there is a best way.

I do not wish it understood by my remarks that I mean anything against Dr. Ottolengui's operation *per se,* for it seems perfect; nor do I wish it to be inferred that I mean that the operation should never be resorted to. It has been successfully done more than once.

Dr. John I. Hart. Having seen the case, I think Dr. Ottolengui and the patient are both to be congratulated on so happy a result. I can add nothing to the paper by continuing the discussion.

Dr. M. L. Rhein. I think we all echo the sentiment that Dr. Hart has just expressed, that the result in the patient's mouth is a very gratifying one, to say the least. The question of whether the bite has been jumped or not is one that very likely Dr. Ottolengui can dilate on more clearly than we can. Coming down to the point at issue, which the essayist has presented in his paper, and which Dr. Farrar has touched upon in his discussion, the general possibilities of jumping the bite in this way, in order to bring the lower jaw forward a sufficient distance to practically change the occlusion and lock the teeth more firmly, is one that from the very outset has presented itself to me as bearing only one conclusion. I could never conceive on what rational grounds of surgical procedure there could be any question of the easy possibility of accomplishing this result in a very large percentage of cases. I have the assurance (for it is an assurance) to take exception to the remarks of Dr. Farrar this evening on this subject, in regard to the importance that the condylar articulation in the glenoid fossa would play in this operation. I do not want to be misunderstood; I appreciate the practical exposition which Dr. Farrar gave of the value of this operation in a great many conditions that we meet, but I am now referring strictly to the subject presented by the author and the slight importance which this articulation plays in this operation of jumping the bite. The movement necessary to bring the lower jaw forward is almost infinitesimal. It is so slight that it practically would be impossible, from a macroscopic point of view, to detect the difference. With the eye I do not believe we could detect any especial difference in the way in which the condyle lies in the glenoid fossa by bringing the lower jaw forward sufficiently to jump the bite, as described by Dr. Ottolengui, and before him by Dr. Kingsley.

I believe the essayist has struck the important point in this whole discussion when he refers to the objection raised by Dr. Talbot, that the bicuspids do not occlude in many of these operations. I think the essayist has clearly brought out one of the most important benefits of the operation. He has very clearly, to my mind, outlined the condition in which these cases present to us. The apparent unusual lengthening of the incisors in these cases has always been one of the distinguishing marks of this condition, as though the incisors were too much erupted. The point that the essayist has brought out to-night is a new one to me. I have never heard it before, but it at once struck me as the natural solution of this problem. In other words, the bicuspids are prevented by the deformity from erupting sufficiently to give the teeth their proper length, and in that way we get the unnatural appearance of too much length in the incisors. In the case presented here this evening the bicuspids show up larger in the corrected model than they were in the original model of the deformity. This particular point Dr. Ottolengui has brought out to-night, and I think it is a very valuable one. As a surgical procedure the operation has always seemed to me, if attempted at a young enough age, one that can be done with ready facility. I have seen operations conducted from beginning to end in Dr. Ottolengui's practice in a way that I can feel a great deal more positive of than I can of the case presented to-night, where I simply see the models. I have seen cases of his before the patients had anything done toward the correction; I have seen the apparatus *in situ,* and have seen the results, so that in my own mind, as far as his practice is concerned, I certainly feel that I can bear very strong testimony as to his success.

I have not at my fingers' ends at this moment cases in my own practice to which I can refer, but I know Dr. Andrews has carried out this operation in at least one case satisfactorily. The only object I have in going into this question is to stamp as positive, as far as my own opinion has any value or any weight, the fact that the operation is one that can be accomplished. I know of nobody in the profession to-day who makes a positive statement of its impossibility with the exception of Dr. Talbot. I would like, Mr. President, to ask Dr. Farrar to make clear the point that I have raised, whether he says there is any great variation in the position of the condyle in the fossa in this operation, as outlined by Dr. Ottolengui, in bringing the lower jaw forward; whether it produces any great difference in the position of the condyle in the fossa?

Dr. FARRAR. You made the remark that you cannot see the movement of the condyle. Very true, it cannot always be seen, except in very thin, spare faces, but it can *always* be felt by the finger. The main question is, *Can the condyle be moved forward and be made to unconsciously stay there permanently?* As I understand it, this operation requires the movement of the jaw forward, and this cannot be done without moving the condyle forward somewhat.

If spare faces in action be studied, it will be noticed that every time the jaw moves forward the condyle is thus affected. The joint does not open much, and that slight opening permits of wide range of movement of the front teeth. Still, a jaw forced out of its position of normal equilibrium must tend to fall back unless held by full and complete antagonism, and even then I have my doubts about the condyle ever becoming normally stationary,—that is to say, stationary in its new position, without the use of more or less will power. That is the real question before us, and I hope it will go on being asked until these fine points are worked out; not by mere talk, but by scientific investigations, anatomical. Until then much of the talk in society meetings must seem somewhat ill digested. This necessarily will be so until we have more facts as a basis to work upon.

Dr. OTTOLENGUI. Dr. Farrar suggested that looking at the patient now, he could not tell whether the teeth of the lower jaw had been moved forward, or the lower jaw itself. There is no difficulty whatever to decide that, in my mind, for the simple reason that the teeth of the lower jaw are all in tight antagonism, and if the lower jaw is brought forward by this instrument, so that the incisors occlude with the incisors of the upper jaw, you cannot bring the bicuspids forward without moving the cuspids forward, and you cannot bring forward the cuspids without bringing forward the incisors, and you cannot bring forward the incisors of the lower jaw without bringing forward those of the upper jaw, and you cannot bring those forward without returning to your protrusion.

Another thing that seems to be entirely overlooked is the chin. If the gentlemen who correct these cases do not jump the bite, what do they do with the chin? Do they leave the chin back of the normal pose?

Dr. RHEIN. The point I asked Dr. Farrar he did not reply to. He admitted what I knew he would admit, that the amount of movement in that joint is infinitesimal. I know there must be a movement, but that movement is so slight that it does not prevent the condyle settling in a little different position in the fossa, because it is not extensive enough to practically change its anatomical articulation. The variation is so slight that it only requires a certain number of months for the tissues to hold it firmly, and it has a new articulation so slightly different that you could not detect it by sight. The feeling that he speaks of we would get more or less in any occlusion, because in bringing the jaws together there is a movement of the condyles which you can perceive in any normal jaw. It is very diagnostic of a certain form of interference in a proper closing of the jaw, but it does not bear on the point brought out by the essayist. The point I wanted to make is that there has been too much importance placed on bringing about a new articulation of the condyle in the fossa, that the movement is so slight that it becomes a very easy matter for that condyle to accommodate itself in a little different position.

Dr. WALKER. What appliance did you have on the lower jaw?

Dr. OTTOLENGUI. Nothing whatever.

Dr. LEROY. It seems to me that the reference to the compass is not proper. I think we might liken it more properly to two planes; when we move one of those planes one-eighth of an inch on one end, they being exactly parallel on their edges, the movement is evident on the other end. It is certain that that motion takes place in the glenoid fossa, but it is a question whether nature does or does not accommodate itself to the changed conditions in bite-jumping. We do our part mechanically, and nature does its part, it is safe to say, by putting the condyloid process in a new relation to a new glenoid fossa. Such is my deduction. Dr. Farrar says he did not think it was possible to do that operation without creating a deformity in that articular process. Any change from normal might be so termed. I would like to speak of two cases, one of anterior jumping of the bite, and one of a posterior jumping of the bite. I referred to the case of the posterior jumping about a year ago, and told Dr. Ottolengui the operation was in course of procedure at that time. At the present time it has been completed, and is a success, without the movement of the teeth in any way. The space that exists between the first bicuspid and the first molar is the same now as it was when the first models were taken. That was a marked case, inasmuch as it involved only one side of the face. The right side was fairly normal in its appearance, except that the anterior teeth were slightly inclined to the right side, the left side having the protrusion. It made the attachment of retaining appliances to correct the deformity rather a problem, but eventually we corrected the condition and we have the patient to show as evidence.

The case of the anterior jumping is, I should judge, very similar to Dr. Ottolengui's. It was due to the extraction of the first permanent molars prematurely, and the interior or backward inclination of the upper incisor teeth. The first operation was the moving of the incisor teeth forward, and subsequently the jumping of the bite the distance of a bicuspid, which was completed. In my hurry this evening, I came away without photographs which I wished to show, but will take the liberty of sending them to Dr. Ottolengui. I have had four cases of jumping the bite, three of moving the teeth forward and one backward; I have come to consider the forward moving of the teeth as one of the simplest operations in orthodontia, the backward movement the most difficult. The suggestion that Dr. Ottolengui has made in reference to the elongation of the lower teeth I have never given very much thought to. I think, though, the doctor's solution is a good one.

Dr. Henry D. Hatch. Concerning the matter of whether or not nature will accommodate herself to the change in the glenoid fossa, I will cite two instances that just occurred to me. When I was in the College of Physicians and Surgeons in Baltimore, I saw a colored woman of middle age, who had a bilateral dislocation of the lower jaw, which had been neglected for about six months, or perhaps it might have been a year. She was in one of the charity hospitals there, and no attention had been paid to her, she having been all that length of time with the mouth open in the characteristic position that obtains in these dislocations. The professor of surgery put her on the operating table, and tried to reduce the dislocation; but the tissue had so filled in the glenoid fossæ back of the condyles, and was so dense, that he could not reduce it. Other surgeons tried to reduce it, and they could do nothing with it either.

The other case was found in the dissecting room, a dislocation of the humerus. The head of the humerus had been thrown down, —a sub-glenoid dislocation,—and had remained there. The old cavity had filled up, so that it was nearly level. A new socket had been formed below the old one, which was nearly as deep as the original socket, and the arm was playing in this new socket.

Dr. OTTOLENGUI. You may have noticed that I did not say much about the glenoid fossa in my paper. I had a reason for that; the glenoid fossa has so little to do with jumping the bite that I hardly think it worth discussion. I must explain that. It has, of course, a relationship, and all scientific points are worthy of discussion as a matter of scientific interest; but the relationship is about the same as the question of etiology of irregularities in connection with the correction of irregularities. I am well aware that some consider that it makes quite a difference whether heredity can be traced. It makes no difference with me. I keep a retaining appliance on the teeth of a child whose parents and grandparents never had crooked teeth for forty generations back, just as long as if the grandfathers and grandmothers all had crooked teeth.

About this glenoid fossa, most of the gentlemen, including Dr. Talbot, seem to think that jumping the bite involves some pathological change. It is not at all pathological; it is physiological. It is not a question of whether the jaw can be placed in a different relation to its glenoid fossæ, or not; but it is the fact that the patients come to us with the ability to close their jaws in numerous different positions, and we select the one that will be best adapted for the external symmetry at which we are aiming. It is simply a question of habit, and not a question of anatomy or changing of articulations. Many years have passed since Dr. Talbot raised this question, and I have made it my business to measure the possibilities of changing the bite. I will ask you gentlemen who are here to close your mouths in the normal backward position, and then see how far forward you can move your lower jaws. Do you think you are making any change in your glenoid fossæ? Is it not so constructed that you can make that forward closure? Then why do not you do it always? Simply because you are in the habit of closing it as you do. In prognathous cases sometimes the jaw is in an abnormal position. Development has been arrested, and the result is that the jaw is biting back of where it should bite. I have theorized that there is more mobility in those cases than in normal cases, and I have found by practical measurements that it is true. I found one patient who could move his lower jaw forward one inch. Is it too much to ask that child to move it forward one-eighth of an inch? Will it be a great and tremendous feat to have that child grow accustomed to biting in that new position? Theoretically, you would say no, but it is a fact that habits are different in different persons. Some people can give up smoking and never smoke again. Others cannot. The same is true of muscles. You may not have thought of this. I will relate an instance, and you can experiment. Those of you who have never written with your left hand at all will probably be astonished to know that if you will write with the left hand you will write the same as with your right hand. Ordinarily in writing you move the hand from the *left* side toward the *right;* now take the pen with the left hand, and write from the *right* side toward the *left;* then look at it holding it up to the light, reversing the paper, and you will find the same chirography. That is what mental control of muscles will do.

If the patient is of that mentality that you can break up the habit of biting in one position, you can do it. It can be done with varied success, of course. I have known patients to change the habit of biting in three or four months; in others it has been necessary to keep the biter on for a longer period. I believe that this child wore the bite-jumper for a year. In another instance which was reported at the time of the discussion in 1892, I remember a child whose case was finished just prior to the summer vacation, and there was not time to make more than the simple retainer. I explained to her all about jumping the bite, and said we would finish the correction in the fall. I asked her to see what she could do voluntarily. I said, "Keep your mind on holding your lower jaw forward." She came back in the fall with as perfect an occlusion as you would want to see, with the lower jaw biting in an entirely new position. The gentlemen who speak about this thing being impossible may convince you who have never tried it, but what potency have their arguments with me, when I have had twenty or more cases of jumping the bite, all of them successful, with only one failure, which I shall take pleasure at some future time in reporting. In these cases I have not only been able to jump the bite, but I have been able to make the patients retain that position.

I want to say something here about retainers. How long shall a retainer be kept on? If teeth are worth regulating, they are worth keeping straight. It is not always as easy to keep them straight as it is to get them straight, as Dr. Farrar has said. A remark Dr. Farrar made, ten or twelve years ago, has influenced my practice ever since. He said some people were so anxious to have their teeth straight that they would wear a retainer all their lives, and it is no harder to keep a retainer in the mouth than a set of artificial teeth. My patients keep them on day and night, except at meal-time, which facilitates keeping them clean. My retainers are all made of metal, and can be boiled and kept clean. After they have been worn a year, day and night, the instruction is to wear them at night only, and there is no limit to their wearing it at night, except I say to them in a laughing way, "When you get married, you need not wear them any more." My children often wear them for years. The children report to me at least semi-annually, so that I may see how their teeth are, and I am in a position to know whether the teeth remain straight or not.

I have successfully jumped the bite in at least twenty cases, and they stay so. You need not worry about the glenoid fossa. Let the anatomists tell us what happens there. You go right ahead.

A theory that controverts a fact is a false theory. I come back to the question of gentlemen who do not jump the bite. What do you do with the patient's chin? When a patient comes to you to have her teeth regulated, she has the right to have as pretty a face as can be made for her, and if her chin is in a wrong position, and you can place it in a right position by the easiest operation in orthodontia,—jumping the bite,—why do you not try it?

On motion, the society extended a cordial vote of thanks to the essayist for his valuable contribution.

Adjourned. B. C. NASH, *Secretary.*

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, October 17, 1899, at the New York Academy of Medicine, 17 West Forty-third street, New York city; the president, Dr. S. G. Perry, occupying the chair.

REPORT OF THE CLINIC COMMITTEE.

Dr. J. F. P. HODSON. The gentlemen who were present this afternoon have reason to congratulate themselves on seeing the clinic given by Dr. Evans. I will not presume to describe the clinic, but will ask Dr. Evans to do so himself.

Dr. GEO. EVANS. I demonstrated that gold crowns can be enameled with the Jenkins porcelain very artistically. A seamless crown is shaped to the exact form of the tooth by methods that I explained this afternoon in this way: I form a little tube of copper that fits the tooth without any solder, by a special method, and take an impression of the tooth in plaster. Taking the tube from the tooth, I wind around it a piece of paper, pour in fusible metal, and form a die. The shank of the die I lengthen slightly on its removal from the tube. If desirable, I pour another one in the tube to use as a guide in shaping the neck of the gold crown, so as to very nearly meet the margin of the gum on its being adjusted in the mouth. I then shape a stamped-up ready-made seamless crown on the first die by driving the die into the crown, using as a matrix a folded napkin or towel. I thus manage in a few minutes to shape the gold crown to the exact form of the tooth. It is hard to describe these things verbally; I can demonstrate them much better. The crown must either be seamless, or a crown that is soldered with pure gold. The gold of which the crown is composed will have to be alloyed with platinum. This permits it being soldered with pure gold. The crown being adjusted on the tooth, I mark on the labial surface the amount of gold that is exposed on viewing the patient directly from the front. I then remove the gold crown and thin the marked labial surface enough to admit of the gold of the crown being slit close to the grinding-surface, and pressed inward against the tooth to give room for the porcelain body that is to be placed on the crown. I then perforate this compressed section of the gold, and fuse the Jenkins body on the gold. It requires about four bakings to perform the operation. If it is a pulpless tooth, you can take much more space for the presence of the porcelain body, by removing what is necessary of the natural tooth. Where there is a badly broken-down tooth, simply a root, I insert posts in the root and shape down the coronal section with amalgam. I have some specimens here which I shall pass around and you can examine them. One I made this afternoon. One of the specimens has an S. S. White tooth ground down to a mere wafer fastened in the front of the gold crown with the Jenkins porcelain body. The specimens I exhibit have among them the die I formed the crown on this afternoon. The others show how I shape crowns and also explain the subject of the impression tubes and the dies. I carve pieces of bone to represent teeth, because the natural teeth become so brittle, in time they are apt to break. The process of inlaying crowns with porcelain is specially intended for teeth with living pulps. The one I baked this afternoon has the porcelain anchored inside the crown, in a mass down inside the grinding-surface, and is anchored there in such a manner that it is impossible for it to break or loosen at that point, which is where the force of the occlusion comes. The part that extends up over the labial portion does not receive much pressure. The oxyphosphate, being behind the gold, stiffens and supports both gold and porcelain. I have soldered in mere films of porcelain on crowns and cemented the crowns on teeth years ago, and they are there yet. Some of them have checked, but I have not seen any come off.

Dr. A. L. NORTHROP. If you use this porcelain in cases where there is strain, will it loosen or crack the porcelain in the crown?

Dr. EVANS. Yes, it is possible it might crack it. I have only gone into this particular style of porcelain work recently. I have presented this subject to you at the request of your committee, as one of my little investigations in that line. I present it the same as others present their investigations. As to the practical result, I do not want to place myself on record as saying that this operation is an infallible one, but, from the way it looks, I think it will enable us in many cases to cover over and hide the glaring gold that is so often displayed in crowns in the front of the mouth.

Dr. HODSON. You make the gold bear the strain of mastication?

Dr. EVANS. Undoubtedly; the gold crowns that are enameled have been first reinforced with pure gold. One way is to clean perfectly the inside grinding-surface of a gold crown and scratch the surface, and with a sharp plugger take some freshly annealed pellets of foil and pack them in just where you want to thicken it. You pack the gold the same as a filling. The gold adheres. You can then take a small-pointed agate burnisher and burnish it solid. You thus instantly form solid cusps in a gold crown. This afternoon, demonstrating this process, I also put a piece of pure gold with a little flux on it in one of these gold crowns and melted it into the cusps. I also slit a crown and drew it in and soldered it with pure gold, 24 k. There is a point to be explained in this. Some gentlemen looked with apprehension when they saw me do it. You should not heat up the gold plate quickly or hotter than is necessary to just melt your solder. If your solder is not heated in proportion with the crown, the moment it melts it perforates the overheated gold, and that is the way a hole is melted in the crown. Put in a piece of 18 k. gold or even 14, and hold it over the flame of a Bunsen burner; heat it suddenly, and you will see the crown get to a pink shade with the solder still dark. The moment the solder does melt, the crown being hotter than the solder, it has such an affinity for the gold, the solder goes through the crown. When I put in pure gold and gradually heated it up you could see that both crown and solder were the same temperature, the pure gold melting at a slightly lower temperature than the crown, and, when it fused, flowed on the surface of the crown. The crown is made of 23 k. gold, slightly alloyed with platinum. Pure gold can therefore be melted on it.

Dr. J. Bond Littig. Do you find that this method is stronger than that you used several years ago? I mean where you compressed the gold crown and inlaid it with a piece of porcelain.

Dr. Evans. I do. The process I used at that time was somewhat similar to yours. I inlaid the little piece of porcelain and flowed solder around it. In your case you soldered the little strip of gold that was to inclose the porcelain on the crown first, and then burnished gold on the porcelain as you inlaid it.

Dr. Littig. After that you used a method by which you compressed the outside of the gold, perforated it, and baked the porcelain on the outside. Do you find this as strong?

Dr. Evans. That was done with the glass filling, and I found it discolored in time, and I had to go over the operation. This process I described to-day is in some respects similar. In the present method, the heat required for the Jenkins porcelain is about 100° to 150° below the melting point of pure gold. I accordingly use pure gold to do the soldering.

Dr. Littig. Would not copper in the solder discolor the porcelain?

Dr. Evans. Yes; that is the reason I use pure gold. All porcelains are very sensitive to any of the base metals, and you cannot put any base alloy in gold used in connection with the fusing of any porcelain that I know of. I call the Jenkins body a porcelain, fusing at a low temperature. Just what the ingredients are I do not know. Dr. Darby stated some time ago that Dr. Jenkins obtained information regarding this porcelain from the porcelain workers in Dresden. I understand there are secrets regarding formulas for porcelain. Those who have read up porcelain art will know that this is so.

Dr. Hodson. I was asking Dr. Evans this afternoon whether this material will endure as a thin film. He explained to me that he thought it would sufficiently well; that it was deeply imbedded by the perforations, especially near the grinding-surface, and by the undercuttings necessary to hold it. On the other hand, supposing it did not endure, we would only have to renew the gold cap, which is comparatively simple as compared with the renewal of a porcelain crown.

The PRESIDENT. It was very evident last spring that there was a widespread interest in the matter of porcelain inlays. Gentlemen said that they had come to stay. My observation abroad and in this city during the summer has led me to think that it is so, and interest in it at this time is as keen as in anything else in dentistry. There has come about a condition of things in the profession, owing to the circumstances of Dr. Jenkins coming here with his body, and with certain high-fusing bodies being developed in this country, by which there are two armies engaged in pleasant warfare, one advocating the Jenkins or low-fusing body, and the other advocating the high-fusing body. It is a very interesting question to find gentlemen of equal intelligence relating their experiences, one with the high-fusing and the other with the low-fusing body, each as earnest in his conviction of the advantage of his system as the other. Without following the order of the evening, as laid down in the by-laws, I want to call for some remarks from Dr. Van Woert relating to his method of the use of the high-fusing system, and particularly his use of very thin platinum, in connection with this matter. Later I shall ask for some remarks on the Jenkins system.

Dr. F. T. VAN WOERT. I am a little surprised to learn that there was any warfare, agreeable or otherwise. From what I have heard of the controversy that has taken place in this city and elsewhere, I believed there was no doubt but that either method would fill the bill. It is only a question of which is the most applicable to the individual. Personally I believe that the high-fusing body is stronger than the low, and that I can manipulate it as easily as I can the low-fusing. Platinum for the matrix is rolled down to 1-1000 and 1-2000 of an inch in thickness. It is prepared by annealing it in an electric furnace on a slack-lime slab, credit for which is due to Dr. Custer, which makes it almost as soft as lead. Since I can get a metal that will stand the heat which platinum will, and of which I can make a matrix as readily as I can of gold, it is reasonable to suppose that I will select the material for the inlay which has the most strength,—namely, the high-fusing body. Setting aside the question of strength, the possibility of changing the color of a high-fusing body is of not much consideration, while of a low-fusing body the change is sometimes so much that the piece is utterly worthless. In making the matrix, I take a piece of modelling compound and form it in pencil shape, sharpened at one end, and with this warmed obtain an impression of the cavity. When hardened in cold water, a counter-die of this is obtained by means of a similar pencil. The matrix is now formed as accurately as possible by pressing between this die and counter-die, and afterward perfected by burnishing into this cavity in the tooth. The procedure following that is identical with all the rest, except that I do not use any alcohol and but very little water with the porcelain body, and the water has all the gum tragacanth that it will take up cold. This is just enough to make a sticky mass of the body, and it can be manipulated on a spatula like a piece of putty. Investing it as Jenkins does, it can be cleaned free from the margins, and the resulting inlay thus made from body packed closely into the matrix is more dense than one made from a wet mass merely settled down by tapping. That is my experience. After the first baking, I remove it from the investment, put it into the cavity, reburnish the margins, and then proceed with the baking,—once, twice, or three times, as the case may be,—and then strip the platinum from it. In the beginning I had the same difficulty as most of you have had in times past,—namely, that of getting an attachment to the under side of the inlay. Cements would not hold them, because the porcelain was glazed. To grind them was almost an impossibility, as they were so small. One day I hit upon the idea of etching the under side with hydrofluoric acid, which I did by investing in beeswax the surface not to be changed. When this has been properly done, I have yet to see one that has come out. I remember a year or more ago that Dr. Ottolengui, speaking on this subject, said one of the greatest difficulties was to keep in place those thin wafer inlays. By this method they may be retained perfectly. I have no objection to the low-fusing body, other than that I get as good results with the high-fusing body, with more ease and less work.

Dr. E. S. GAYLORD, New Haven. Does not the gum tragacanth blacken?

Dr. VAN WOERT. Only during the early stage of the heating. Before the fusing point is reached the gum is burnt out and the porcelain resumes its natural color. Allow me to emphasize one point of great importance, and that is, that we must as much as possible reduce the substance that is between the inlay and the wall of the cavity. The thicker the matrix, the more cement we will have. That led me to cut down the thickness of the matrix, but by thinning rolled gold to 1-2000 of an inch it would not stand the heat even of a low-fusing body. It would burn or curl before I could be sure I had it perfectly fused. With platinum that is out of the question.

Dr. EVANS. I think Dr. Jenkins's porcelain and the subject of high- and low-fusing bodies can be summed up in this way: Dr. Jenkins has introduced his porcelain more for the formation of inlays in the teeth than he has for building up the teeth or for tips, and the former is what I think will be its sphere. As to close fit of inlays to the margins of the cavity, I examined this summer the work of about all the leading operators in this branch that were at the different dental societies and elsewhere, and the work of Dr. Jenkins showed a closer line of margin to the cavity than did the high-fusing bodies. What Dr. Van Woert has succeeded in doing, I do not know; but from what he describes and the detail with which he carries out his work, it is possible that he has accomplished what the other gentlemen have not been able to do.

As to the use of a high-fusing body, in one particular line of operation, I mention this. Dr. Land this summer informed me that to form a tip to an abraded tooth the best porcelain body he found for the purpose was to take an S. S. White tooth of the proper color, remove the pins, pulverize it finely in a mortar, and use this pulverized tooth as the porcelain body to form the tip. That is where the high- and low-fusing bodies are going to compare. I think it will result in the low-fusing body being used for inlays, and the high-fusing for tips of teeth, etc.

Dr. W. J. TURNER. In the small experience I have had, I think there is no comparison with the way the different bodies fuse down. The Jenkins body fuses smoothly, and evenly, all the way down in such a manner as I have not been able to get with either Ash's low-fusing or the Consolidated high-fusing body.

Dr. NORTHROP. I would like to ask Dr. Turner what is the advantage of having a body that is perfectly smooth.

Dr. TURNER. I like to see a porcelain fuse down perfectly smooth. It is cleaner, and it matches the rest of the surface of the tooth more perfectly; and this surface, with the Jenkins body, is obtained very readily. I think Dr. Evans showed that this afternoon. The baking of the thin film on the gold crown was done with the greatest ease, and was perfect.

Dr. LITTIG. I have spoken so often on this subject that I can add nothing more than indorse Dr. Van Woert's remarks. Porcelain, as far as I understand it, consists of feldspar, silex, and sometimes a little kaolin. The kaolin is an infusible substance, because it has been deprived through nature's efforts of the potash or soda which has been washed out of it. The quartz we put in is merely to hold its form. Sometimes to lower it we put in some kind of a flux—French plate glass or something of that kind—to make it flow easily.

[The paper of the evening, entitled "Review of Fifty Years of Dental Practice," was then read by its author, Dr. C. A. MARVIN, Montclair, N. J. Owing to its length our space limits preclude its publication here, but it will appear in full in the society's Transactions.—Ed. DENTAL COSMOS.]

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

ANNUAL CONVENTION OF THE SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Concluded from page 91.)

SECOND DAY—*Morning Session.*

THIS session was devoted to clinics. Dr. F. W. PROSEUS showed a case of replantation. The patient was a boy nine years old. The tooth, an upper right central incisor, had been knocked out by a blow from the handle-bar of a bicycle. After lying in the road over night, it was replanted two days after the accident.

The tooth-socket was first thoroughly scraped and the edges of the gum scarified. Bichlorid solution, one to eight thousand, was used to disinfect the tooth and socket. The tooth was held in place by thin platinum caps cemented on the two adjoining teeth. There was considerable inflammation for the first three days, but when shown at the clinic, six days after the operation, the gums and tooth were in splendid condition. The root-canal was filled through the apex of the root, and oxychlorid of zinc was used in the pulp-chamber to prevent discoloration of the teeth.

Dr. F. MESSERSCHMIDT exhibited models showing the use of Dr. V. H. Jackson's cribs and wire clasps for holding base-plates in position when getting articulations; also for retaining partial dentures when artificial teeth are required on only one side of the arch. Dr. Messerschmidt also demonstrated the construction of a clasp as described by him in the DENTAL COSMOS of May, 1895.

Dr. L. C. JONES, Wolcott, N. Y., demonstrated his method of preparing and placing in position a dental crown at a single sitting, as follows: When this is to be done and he finds that he has no crown in stock that will answer, he selects a suitable plain rubber tooth to be used as a porcelain facing. He then cuts a piece of German silver wire long enough for the post, files one end to a point, and flattens and notches the other to go between the pins of the facing. With a pair of pliers he presses the pins into the notches to hold the tooth in place. Then, the roots having been previously prepared, he places the pin and facing in position, holding them with his left hand, while with the right he presses some softened wax around the post and pins and over the end of the root. This gives him a correct impression of the end of the root with the crown and post in their respective positions; in fact, the position they will occupy when they are finally mounted. He now removes the piece altogether, and trims off the surplus wax. He then invests in plaster, and as soon as the plaster sets pours boiling water, letting it fall twelve or fifteen inches, on the wax, which soon washes the wax out. It is necessary to be absolutely sure that it is perfectly clean.

The investment is now placed over the fire for a few minutes to dry the surface, and two or three drops of soldering fluid (zinc chlorid) and a small piece of fusible metal are put on the metallic posts. A firm blast from the blow-pipe causes the metal to melt and flow where wanted, and, waiting till just before crystallization takes place, he presses on it hard with the moistened end of his thumb to force the metal into all the spaces. He now cuts away the plaster and files and polishes the metal, and the crown is ready to mount. It fits the emergency, hence he calls it the emergency crown.

He also spoke of his way of keeping the root-canal free from moisture, and as well the end of the root and surrounding gums. After wiping out and drying with hot air, he takes a piece of Gilbert's temporary stopping, and, after warming it, presses it over the end of the root and surrounding gum. This will perfectly seal up the end, and it will be as dry when he opens it as when he closed it. He then can take his time to mix his cement, and need not worry for fear of moisture.

Dr. W. A. Barrows, Buffalo, showed a rubber-faced die-punch. He said many a dentist just before striking up the cap for an all-gold crown has placed his square piece of gold on the die-plate; upon this he has carefully placed his leaden bullet, and over this, with still more care, he has poised his die-punch, and then as the hammer descended the bullet quietly rolled off on to the bench or under it, or on the floor somewhere. After picking up the bullet, and the same process has been repeated several times, the question must have suggested itself, Is there no better way? The better way he found was to face the die-punch with rubber. He cut from a sheet of rubber for vulcanite work a piece just the size of the punch and stuck it on with rubber cement. When the cement is dry it is only necessary to place the punch right on the gold square and strike.

Dr. George Evans demonstrated his method of inlaying seamless gold crowns with the Jenkins porcelain. The crown is first fitted. Enough of the labial surface of the natural tooth is next removed to allow for the presence of the inlay, the greatest amount being trimmed toward and at the grinding-surface. The labial surface of the gold crown is next ground thin, perforated, and slit crown-wise across the line of the edge of the grinding-surface, placed in the mouth, and the gold pressed inward against the tooth. The crown is removed, and this depressed section is filled and shaped out with the Jenkins porcelain body and fused. Three or four applications of porcelain body and fusings are required, but they are quickly performed. The porcelain for anchorage and strength should be extended well into the interior of the crown at the grinding-surface.

Dr. Evans also demonstrated his method of cementation of crowns and bridge-work with gutta-percha, thus rendering them capable of being removed when necessary by the dentist by simply heating the caps.

Dr. M. L. Fay demonstrated a method of applying detachable facings in crown- and bridge-work.

Dr. Fay claims that, besides insuring the setting of a perfect facing without check or break, it is a great time-saver, fully one-half hour being saved in soldering alone. It also makes an aseptically clean crown, without a line of discoloration; allows the operator to use platinum for backing without changing color of facing. We all know what the checking or breaking of a facing means, especially to a busy man. Another advantage claimed by Dr. Fay is the use of the ordinary plate tooth or facing, thus avoiding the use of special teeth, necessitated in other methods, and only kept by few dental depots. Again, there is no radical change in the method of construction to which all are accustomed. The method of procedure is as follows: Prepare the root the same as for a Richmond crown, fitting a gold cap and soldering a post in position; select the facing and grind it to proper position. Now comes the first departure from the Richmond crown. After having filed off one side of the beak of the punch forceps, so that it will cut but four-fifths the way around, as shown by A in Fig. 1, press the pins of the facing into the platinum to be used for backing sufficiently to mark the location of the holes to be punched. Now, with the altered punch, the backing is pierced. It will be noticed that a leaf or tang is turned up at the point where the punch was filed, provided the handles were not pressed hard together. The result should be as shown by B in Fig. 2. It is preferable to have the leaves turned up at the inner sides of the pins. This is easily accomplished by reversing the backing before punching the second hole. The punch is not injured by filing it as shown in Fig. 1, for when one wishes to cut a clean hole it is done by simply pressing the handles closer together, thus bringing the beak past the filed part. Platinum is preferable for the backing, as it is tougher; the wings do not break off as easily should the punch be closed too hard by accident. After the holes are punched and the leaves are bent at right angles to the backing, cut off either side of the leaf at dotted lines as shown by C in Fig. 3, thus leaving a tang or leaf D, with straight sides and narrower to pass through the holes in the bottom of the box. The backing is now adjusted to the back of the facing, and the leaves pressed closely against the pins.

FIG. 1.

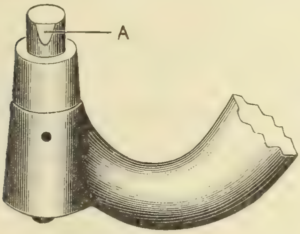


FIG. 2.

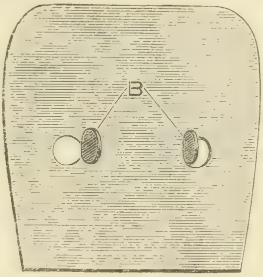
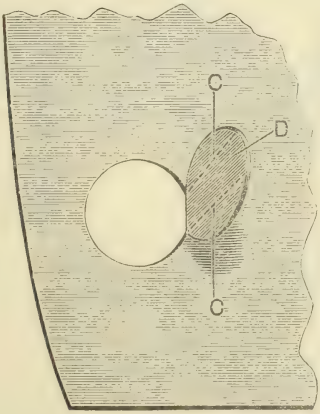


FIG. 3.



The next step is to make the little box which receives the pins. Take a piece of platinum and mark it in the same manner for punching as was done in making the backing. Now punch the holes to correspond with the pins in the facing, but instead of punching lightly, as in the case of the backing, bring the beaks hard together, thus cutting a clean hole. Cut a narrow strip of platinum three-thirty-seconds of an inch wide, and about five-eighths of an inch long. The width will vary with the case, and with the long, narrow-nosed pliers bend it to form the sides of the box. The box should be just large enough to take in both holes. Now place the sides and bottom together, and hold in position with tweezers while soldering. (See Fig. 4.) It is not necessary to solder the band or sides separately, as it will all unite at the one soldering. Trim off the bottom, leaving a small projection from the sides. The completed box is shown in Fig. 5.

Fig. 4.

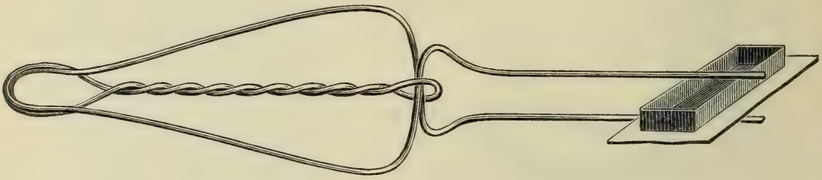


Fig. 5.

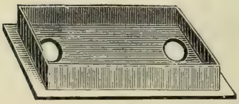
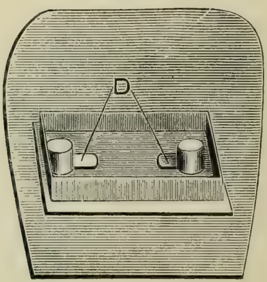


Fig. 6.

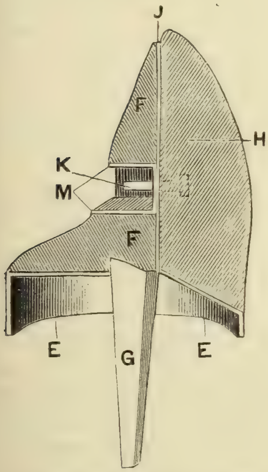


The backing having previously been placed in position, the box is now placed in position, allowing the pins and leaves, or tangs, to enter the box through the holes in the bottom. When the box is down in place, with a small instrument bend or clinch the leaves down against the bottom of the box, thus securing the box firmly to the backing, as shown by D in Fig. 6.

The facing is now ready for the final adjustment. Remove the cap from the mouth, dry thoroughly, and warm it in the flame. With a spatula place a drop of wax on the posterior part. The cap being warm, the wax will adhere firmly. Care must be taken not to have it too warm. Should there be any moisture on the cap, the wax will separate when it is tried in the mouth. Then put a drop of wax on the backing below the box, allowing none to enter the box, as it will interfere with removing the facing. Then place the cap in position in the mouth, and adjust the facing and backing to its proper position. The two drops of wax coming together in the rear will hold the backing and facing in place. To make it doubly secure, unite the two portions of wax with a warm spatula. With a suitable instrument reach under the free margin of the gum and loosen the cap from the root, the crown coming off intact. Before the wax has had time to contract take a sliver of match or small wire and place it on the rear of the crown, letting it extend from the cutting-edge of the backing to the back edge of the cap; seal at each point with wax. This prevents any contraction of the wax from drawing the facing away from the cap at the cervical margin and leaving a crevice when the crown is completed.

The crown is now ready for investment. Remove the facing carefully, being sure it is close against the cap at the cervical margin. Invest the same as for a Richmond crown. Allow the investment to come up through the holes in the bottom of the box, and at the same time fill it even with the top to exclude all solder. A good investment is "Fyrite," as it does not shrink, crack, or expand, which is very important. The investment should be level with the backing. As soon as it sets, place it upon your frame and heat up as rapidly as you wish. Solder, and as soon as it has cooled a moment drop it in water, and the crown is ready to finish.

FIG. 7.



E, gold band and cap; F, gold solder; G, metal post; H, porcelain facing; J, backing; K, pin of facing; M, platinum box.

FIG. 8.

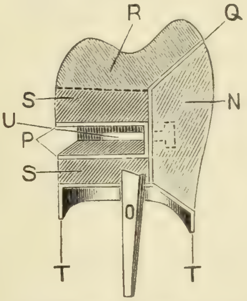
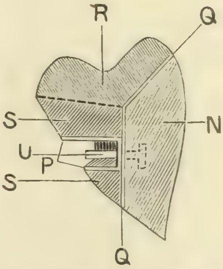


FIG. 9.



N, facing; O, post; P, platinum box; Q, platinum backing; R, gold or platinum cusp struck up and filled with solder; S, solder; T, gold cap; U, pin.

The finishing is best done with the dental engine, using stones and disks in shaping up and contouring the back. The facing is now set in place. Any grinding that is necessary about the neck is then done. This generally adds very much to the beauty and appearance of the crown. The facing can easily be repolished with a small wheel of cork on a mandrel in the engine with the aid of pumice stone.

The facing, having been ground and polished, is now ready for the final setting, which is done in the following way: The surface of the backing, which has been warmed in the flame, is smeared with stopping or gutta-percha, and while soft the facing is pressed to place. Hold for a moment, and with a sharp-pointed instrument remove any that has pressed into the box. Clinch the pins next by pressing one at a time over and a little to one side. This will allow both pins to lie flat upon the bottom of the box. Sometimes it is advantageous to cut the end of one pin a little shorter than the other. With a little white alloy mixed dry, fill the box, and whenever possible polish with a disk when hard. Also turn a feather-edge of the gold over the facing with a disk; this seals the gutta-percha and makes a smoother finish. Fig. 7 represents a sectional view of the crown completed, except the clinching of the pins and filling in of the box.

A crown made by this method not only has a perfect facing, but is exactly the same shade as was the facing when selected, no heat having come in contact with it. It has no discolored lines or crevices. Especially where it is used in bridge-work, the spaces between the teeth can all be polished, making a much cleaner piece of work. In case the patient meets with an accident, as is often the case, the alloy is easily removed from the box, and a new facing quickly adjusted without the tedious drilling we have in a Richmond.

Fig. 8 shows the sectional view of bicuspid crown, and Fig. 9 a dummy used in bridge-work.

Dr. F. A. GREENE, Geneva, showed an easy method of making a good-fitting gold crown or band. After the tooth or root is prepared he takes a piece of thin, soft copper plate, a little wider than the length of the crown to be made and considerably longer than the circumference of the tooth. This he doubles onto itself, so as to form a loop of the middle portion and bring the ends together flat. The loop should be a little larger than the root. The ends are soldered together, and the loop placed over the root and crowded well up under the margin of the gum; and while in this position the ends of the loop are pinched tight together with a pair of flat-nosed pliers, so as to draw the band tight around the tooth. The band is then removed carefully from the tooth and held over a small hole in a piece of metal, and poured full of Melotte's fusible metal. Now remove the band and you will have a plug of fusible metal the exact size and shape of the tooth, upon which the necessary gold band can be made for banding the tooth with perfect confidence of correct fit. The band should be made a little smaller than the plug, and driven upon it.

Dr. J. B. ERNSMERE demonstrated the method of making the Downie crown, and also the Land porcelain jacket crown. In the former the root of the tooth is prepared the same as for a Richmond crown, excepting that in reaming out the pulp-canal to receive the post it should be slanted toward the lingual or palatal side. This is done to allow room in front of the post for the porcelain facing. The cap and band are made of gold-faced platinum, gauge 30, and soldered with pure gold. The post is made of platinum alloy wire, and is allowed to project through the cap and band, the projecting portion being flattened somewhat. To this is attached the porcelain facing by bending the pins, the facing having been first ground to fit and the post notched where the pins are to meet and clasp it. These preparations completed, the cap and facing should be removed from the tooth and the back filled with porcelain body and baked in the furnace. Two firings are generally required.

To make the Land porcelain jacket crown, first grind the tooth to be crowned to suit, then fit to it a platinum jacket, about 40 gauge, soldered with pure gold. Let the platinum be wrinkled or roughened where the porcelain is to be attached. On this fuse in the furnace a little porcelain body, cool and replace on the tooth, and fit to it a Land porcelain veneer of the size and shade required. Add a little more porcelain body, and then remove from the tooth and bake in the furnace. It is now ready to be cemented in place. The Land porcelain veneers are made very thin, and are without pins.

DENTAL SOCIETY ANNOUNCEMENTS.

VERMONT STATE DENTAL SOCIETY.

THE next annual meeting of the Vermont State Dental Society will be held at St. Johnsbury, Vt., March 21, 22, and 23, 1900.

A cordial invitation is extended to all. THOMAS MOUND, *Sec'y.*,
Rutland, Vt.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of New York will hold a clinic in the infirmary of the New York Dental School, 216 West Forty-second street, on Tuesday afternoon, February 13, 1900, at one o'clock.

DAVID C. BAKER,
Chairman Clinic Committee.

EDITORIAL.

THE NATIONAL INSTITUTE OF DENTAL PEDAGOGICS.

THIS rather cumbersome, though expressive, designation was adopted by the National School of Dental Technics at its recent meeting, held in Philadelphia, and represents the more comprehensive and broader field into which this important educational organization has developed. Starting a few years ago in a small way, and with a limited scope, it has grown in interest and importance until it is rapidly becoming one of the prominent educational factors in dentistry in America.

Its importance grows out of the fact that it meets a need in our educational machinery, and that need is the education of dental teachers in teaching methods.

The initial inspiration was furnished by the sympathetic reception given to the system of dental technic teaching planned and organized by Dr. G. V. Black, and the first work of the association concerned itself mainly with the study and elaboration of Dr. Black's system as applied to the teaching of procedures in operative and prosthetic dentistry. The success which attended this work developed something more important than the elaboration of a comprehensive system in the teaching of these departments of the dental curriculum. It stimulated interest in teaching methods in general, and the investigation of dental pedagogical principles and methods as applied to all the branches of the dental curriculum. The steady growth of that interest has been sustained and nourished by the richness of the field until it has become impossible to confine it to the lines of work for which the association was originally formed, and its new designation is the formal recognition of its enlarged scope and usefulness.

It is not altogether clear to the whole body of American dental teachers why the work of this organization should not be included in that of the National Association of Dental Faculties. It is true that the membership in both bodies is much the same, and that both are therefore ultimately interested in the same work. It is further true that the projectors of the National Association of Dental Faculties intended that the study and discussion of educational methods should be included in its objects. Experience has, however, shown that the legislative and administrative work of that body is so extensive and intricate that no time, or at least insufficient time, can be spared for technical educational problems during its sessions. On the other hand, the volume of work to be done in connection with the meetings of the Institute of Pedagogics is at least equal to that requiring attention by the Faculties Association, so that unless the length of the annual sessions of the latter were doubled the total required work could not be accomplished. For which reasons it would seem to be inexpedient to unite the work of the two associations in one organization.

There is perhaps a more potent objection to any attempt to unite these two phases of educational work in one organization, an objection voiced at the recent meeting of the Institute of Pedagogics, and one which will doubtless appeal to a majority of those interested because of its reasonableness,—viz, the fundamental difference in the character of the work to be done by the two bodies causes a difference of mental attitude which would be inimical to the attainment of the best results in either department if both were thrown together at the same time. A heated debate calling for forensic skill presupposes a mental condition not best adapted to the study of problems in education requiring analytic and judicial qualities of mind for their solution. It would seem that while both are concerned with educational problems, and have a general similarity of ultimate aim, there is a wide enough difference in their immediate purpose and working methods to maintain their separate individualities if the best results are to be attained by each.

The Philadelphia meeting was an undoubted success. The Eastern colleges had much to learn from those of the West, and both gained from the interchange of ideas. A noteworthy feature of the meeting was the exhibits of technical work of the several schools, especially as in a certain sense each school presented the strongest phases of its work. The exhibits were therefore in the nature of specialties, and were instructive correspondingly.

The papers were of more than ordinary merit, and as a whole were the practical evidence of the rapid advancement of our ideas toward an educational system far beyond the antiquated methods of only a few years ago. The most promising element manifested at the meeting was the tendency to study the fundamental principles of teaching, the psychology of the process, as well as the details of routine method. Work of that character is needed to create a higher standard of teaching, and ultimately the best educational results for the student. We congratulate the National Institute of Pedagogics upon its good work, and especially upon the promise of its enlarged sphere of usefulness indicated in the movement which has resulted in its new designation.

A detailed report of the recent meeting will appear in succeeding issues of this journal.

SAINT APOLLONIA.

An interesting incident took place at the December meeting of the Academy of Stomatology which was a pleasant variation from the more technical character of the usual proceedings. Dr. C. N. Peirce, on behalf of a member, Dr. Mary H. Stillwell, presented to the Academy a large photographic reproduction of a painting representing Saint Apollonia, which painting forms part of the altarpiece in the Church St. Apollonia at Rome.

Dr. Peirce, in presenting the picture, gave the following historical account:

"Some of you may be somewhat familiar with the subject to be presented, but doubtless to most of you the history and character of Saint Apollonia, 'the Patron Saint of Dentistry,' will be novel. That dentistry, of all the branches or specialties of medicine, has a patron saint I assume is known to very few in the dental profession. A brief recital of the history, as far as obtainable, of this saint, has a historical as well as professional interest. She was the daughter of a heathen magistrate in the city of Alexandria. Her mother, although not a Christian, was inclined to look with sympathy on the believers in that faith, and often spoke to the child of the wonderful power there was in the prayers of these people. It is not surprising, therefore, that Apollonia, as she grew up, felt more and more deeply that this alone was the one religion that could satisfy and ennoble her life. Longing to obtain the grace of baptism, she made her way to Saint Leonine, a disciple of Saint Anthony of Egypt, and as he baptized her he bade her go to Alexandria and preach the faith. So she went forth; and though she was only a woman, young and frail, yet so eloquent were her words, so fervent her zeal, that she made many converts. About this time a tumult had been stirred up in the city against the Christians, and the mass of the people were enraged at her preaching and came with bitter complaints to her father, who gave her up to be judged by the governor. They brought her before the idol temple and bade her worship the graven image. It is reported that she made a sign of the cross, and there came forth from the statue an evil spirit shrieking, 'Apollonia has driven me hence.' This was more than could be borne; the people thirsted for vengeance, so they tried by torture to overcome her constancy. She was bound, and one by one her teeth were drawn out, but still she did not flinch or fear; and on her refusal to accede to the demands of her persecutors and renounce her faith she was brutally clubbed about the head and face, and subsequently suffered death by fire.

"For a period of nearly fifteen hundred years her intercession has been sought for relief from all pain incident to dental diseases, and her relics have been and are regarded as possessing great efficacy in the cure of the same.

"The canonization of Saint Apollonia took place about the year 300 A.D.

"On the 9th of February of each year she is commemorated. The so-called relics or remains of her head and jaws which were preserved from the fire into which she was thrown are preserved in various churches in the East and West. Church Saint Apollonia at Rome has a portion; in St. Maria Transtiberina her head rests; in St. Lawrence, outside the walls, her arms; in St. Basil's, part of her jaws; while in churches at Naples, Antwerp, Brussels, and Cologne, portions of the bones or teeth are cherished. In Quebec, Canada, we find also portions of a bone or tooth resting in some of the churches and viewed with veneration.

"Furini has painted her in a picture now at Florence, Luini in Monastero Maggiore, Milan, and in the Milan Gallery there is an altar-piece by Francesco Granacce, on one wing of which is an almost life-size figure of her. Underneath the picture at Florence is the story of her life, from the moment of the angelic call until her death.

"Procaccino has also painted her martyrdom, and she is also to be found in the works of that somewhat sentimental painter Carlo Dolce.

"Chapels and altars in her honor are found in many of the Eastern and Western churches. Her distinctive emblems are the pincers and tooth; the latter in some of the paintings is hung by a gold chain around her neck as an ornament.

"Such records as we have been able to collect of Saint Apollonia give evidence of her dauntless courage, her perfect obedience to what she believed was the voice of God, and her fervent missionary spirit. Her story adds one more link to the long chain of heroes and heroines whose lives strike like sunlight across many a dark page of history.

"The above short sketch has been obtained from Gould's 'Lives of Saints,' Cassell's 'Dictionary of Religion,' and Letter of Dionysius to Fabius, Bishop of Antioch, published in the History of the Christian Church, by Eusebius, during the persecutions of the Christians in Alexandria in the year 249."

Schaff's Religious Encyclopedia gives the following brief account of Saint Apollonia:

"St. Apollonia suffered martyrdom, at an advanced age, in Alexandria during the Decian persecution (249). She was seized, together with other Christians, and received such violent blows upon her jaws that she lost all her teeth. The Pagans then lit the pyre, and demanded that she should curse Christ. She hesitated for a moment, and then suddenly leaped into the fire. During the middle ages she was worshiped as the patroness against the toothache. She is commemorated in the Roman Church on February 9."

Occasional allusions to Saint Apollonia have occurred in periodical literature, but her history, and especially her dental relationship, are perhaps known to but few. Had it been known years ago the cause of women practitioners in dentistry would have had an added significance, as was remarked by Dr. Truman when the portrait was presented at the meeting of the Academy of Stomatology.

OBITUARY.

DR. W. W. H. THACKSTON.

Died, at Farmville, Va., December 8, 1899, of heart-failure, W. W. H. Thackston, D.D.S., in the eightieth year of his age.

Dr. Thackston was born in Charlotte county, Virginia, February 29, 1820. He moved to Farmville in 1833, from which date until his death he was closely identified with the interests and public and private life of that town.

He graduated in 1842 from the Baltimore College of Dental Surgery, thus being a member of the first graduating class of the oldest dental college, and at the time of his death the oldest graduate in dentistry in the world.

Dr. Thackston was a splendid specimen of physical manhood, of commanding presence and courtly bearing; a fine example of the old-school gentleman. His treatment of all, of whatever social station, was kindly and courteous. His intellectual character was refined and of a high order, and his abilities as an essayist and presiding officer made him an honored member and active participant in many dental organizations. His loyalty to his profession was intense and his ideals lofty. His last published paper is an appeal to the better instincts of his colleagues in an effort to elevate his profession toward higher planes, and a protest against the sordid and commercial tendencies which came under his notice. His most active endeavors for the betterment of his calling found expression in the work which he did as an active member of the Virginia State and the Southern Dental Associations. To these he gave his best efforts, and by their members he was respected and revered. In both associations he was honored by being called many times to fill the highest offices in their gift,—offices that he filled efficiently and well.

The impression which he made upon the growth of the profession which he honored cannot be easily defined. It was the impression of a good example, of high ideals, that which makes for loftier professional standards. While these cannot be formulated in terms of their effectiveness, they are the determining forces which after all measure the quality of professional attainment and give to it the elements which distinguish it as a profession. It was the unswerving loyalty of Dr. Thackston to such ideals that gave the color to his life-work. His loss is a great one, for the profession needs all of his class, even though the seed which he has sown is imperishable. His life was unique in that it represents one of the longest periods of devoted relationship to dentistry on record, and covers the time from its birth as a profession up to its present advanced development.

Dr. Thackston was married July 16, 1848, to Miss Mary Elizabeth Fowks, of Amelia county, Virginia, who died about sixteen years ago. Three children, two sons and a daughter, survive him.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING DECEMBER, 1899.

Dec. 5.—No. 638,468, to Henry L. McKellops. Dental pliers.
" " No. 638,534, to Thos. G. and Sarah Welch. Head-rest.
" *12.*—No. 638,973, to Chas. F. C. Mehlig. Dental matrix-retainer.
" *19.*—No. 639,536, to Chas. H. Davis. Dental plugger.
" " No. 639,576, to Frank Hurlbut. Syringe-nozzle.
" " No. 639,585, to Chas. H. Land. Dental filling-material.
" " No. 639,595, to Josephine A. Mitchell. Cleaning pad for dentists' tools.
" " No. 32,005, to Henry E. Weber. Design for fountain cuspidor.

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ORIGINAL COMMUNICATIONS.

MICRO-ORGANISMS IN DENTAL CARIES.

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(Communicated from the Bacteriological Laboratory, Guy's Hospital.)

CONSIDERABLE attention has been directed to the study of micro-organisms of the human mouth during the last few years, and the literature on the subject is rapidly accumulating, so that within the narrow limits of the present paper it is impossible to even refer to some of the interesting problems with which the whole subject teems. I have therefore selected one especial issue which is of interest to those engaged in the practice of dental surgery.

But before discussing the bacteriology of dental caries let me draw your attention for a few moments to one or two general considerations of bacteriological work, and note in passing some of the special difficulties attendant on the study of the flora of the mouth.

The mouth, as you are all aware, is admirably adapted to the growth of bacteria, and for this reason as well as its extreme liability to infection becomes the resting place of the many varieties of organisms found in air, water, and foods; but, as has been pointed out by Sanarelli, Miller, Washbourne, and myself, many of the species quickly disappear, due either to the reaction of the medium in which they find themselves, the temperature, or the action of other organisms; to this latter condition I shall have occasion to refer later.

We are thus met at the commencement with an almost illimitable number of organisms which may occur in the buccal cavity, as well as another equally difficult problem,—*i.e.*, the media upon which to cultivate, many of the buccal inhabitants refusing to grow upon the ordinary laboratory media; there are many other conditions, some of which I have noted elsewhere.*

It will be seen, therefore, that to fully understand what are proper mouth bacteria we must meet the difficulty by careful examinations of large numbers of mouths and noting the bacteria most commonly present, while the question of media can only be solved by constant and arduous work.

But let us for a time consider the first of these two special problems. Evidently if the various workers in the field are to contribute to the common progress of the subject the groundwork of their methods must be upon the same plan; that is to say, in all descriptions †standard media and processes must be adopted as well as the special methods, which must always be clearly stated, whence it follows that the merely accidental varieties will be separated from those bearing a proper relation to the pathological condition, in which so much remains to be elucidated in the domain of dental surgery. But what constitutes a new organism?

Certainly not the morphological differences alone, as so many observers have relied upon (Miller, Vicentini, etc.). No! A new organism must present some points in its biological, pathological, biochemical, as well as its morphological conditions, by which it may be recognized and in virtue of which it differs from other known organisms; with these reactions carefully worked out upon standard media the newcomer obtains a scientific status; with these it can be recognized by another observer, and the personal equation eliminated by individual work.

In no other region of the domain of bacteriology is morphology more elusive and untrustworthy than among the organisms of the mouth. The curious greasy nature of Leeuwenhoek's materia alba, the albumin in the saliva, the *débris* of the food and epithelial cells, and more important still the pleomorphism of the organisms themselves, all combine to render the morphological forms taken direct from the mouth extremely slender evidence, *per se*, upon which to base conclusion or theory.

In a late number of the DENTAL COSMOS Dr. J. Leon Williams gives photographs of a number of morphological forms stained from the mouth direct, and has to a certain extent confirmed some of Vicentini's work, in so far as he shows that there is ground for some of the statements in Vicentini's book, although not binding himself to adopt all Vicentini's claims for the Leptothrix racemosa.

I am able with much pleasure to confirm certain of the statements, but by no means all, while in the first place the method of staining adopted by J. Leon Williams appears to me rather crude for bacteriological work.‡

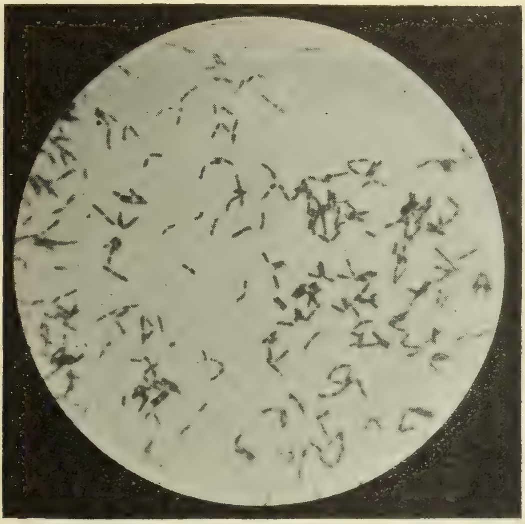
Again, the term diphtheroid organism, as applied by Williams to certain morphological forms, which, in the photographs at any rate, no more resemble the diphtheria bacillus than any other slightly curved bacillus, is a term much to be regretted, especially so as other well-known organisms morphologically resembling the Klebs-Löffler bacillus are often to be found in the mouth,—compare Hoffmann, to mention only one variety.

**Brit. Dent. Jour.*, October, 1898–March, 1899. *Trans. Odont.*, June, 1898.

†Committee of American Bacteriologists. Report of Committee, 1898.

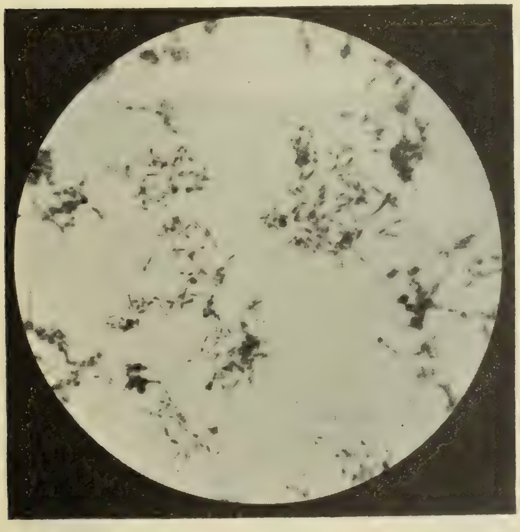
‡ See DENTAL COSMOS, April, 1899, p. 336.

FIG. 1.



B. diphtheriæ. 18 hours serum culture. Pathogenic. × 1000.

FIG. 2.

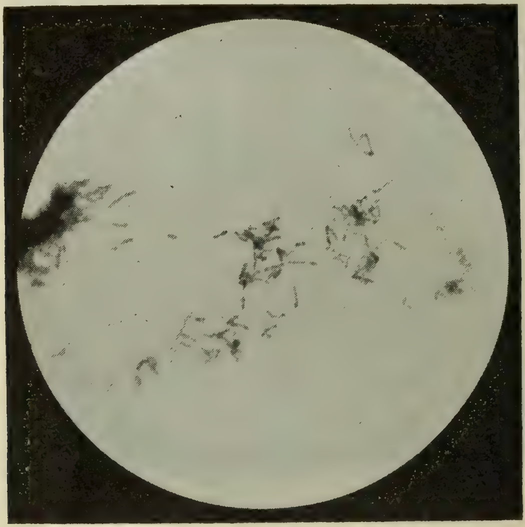


B. diphtheriæ. 10 days serum. Pathogenic. × 1000.

Further, the chance arrangement of bacilli in clumps, such as photographed by him, is not in the least typical of diphtheria, although it might have been ten years ago.

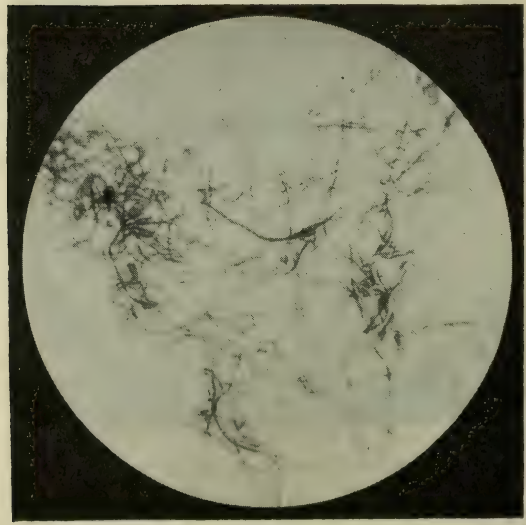
And again, involution forms are of such common occurrence

FIG. 3.



B. plexiformis. 48 hours gelatin. × 1000.

FIG. 4.



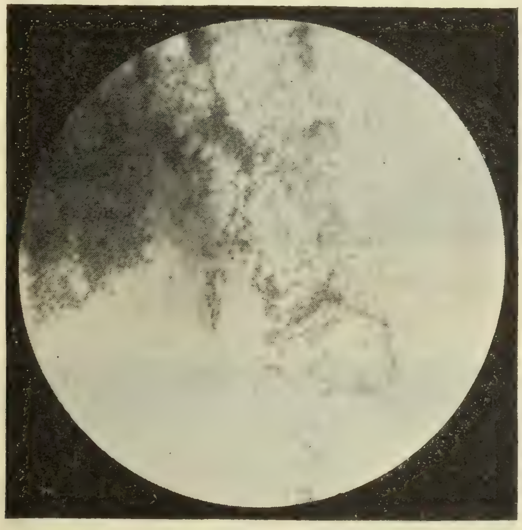
B. plexiformis. 24 hours dentin. × 1000.

in any cultivation of bacteria—compare Streptococcus, Anthrax, Cholera, Subtilis, Mesentericus, etc.—that much care must be exercised in giving the true morphology of any bacilli.

It is also much to be regretted that the experiments as to acid production should have been conducted with such well-known producers of acid, the two staphylococci and Sarcinæ lutea, as reference to any good text-book on bacteriology* would have given the information.

The acid production by organisms is a curious phenomenon, more particularly as the natural growth of bacteria results in an alkaline reaction, and that only certain species in the presence of proper media can bring about a revision of the alkaline reaction.

FIG. 5.



Streptococcus brevis of Von Lingleshelm. × 1000. Diplococcal form (mouth direct), showing cocci massed around epithelial cell.

It is therefore a grave error to mass into one catalogue all organisms which occur upon the teeth as acid producers, although many of them do, and J. Leon Williams's conclusion, "this complete demonstration of acid-producing forms," to quote his own words, is in no wise a complete demonstration until the organisms have all been cultivated on artificial media, and their individual efforts studied, a matter Williams tacitly admits he has not done.

An organism Williams has overlooked, or has not mentioned, is one that Washbourne and myself† have constantly pointed out occurs in every mouth, and I find that on referring to my note-books I have observed a streptococcus in five hundred different mouths, and in one hundred and fifty I have isolated the Streptococcus brevis of Von Lingleshelm in pure cultivation.

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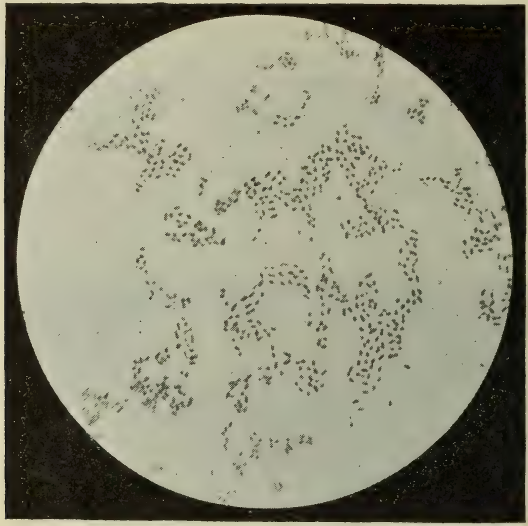
*Sternberg's Manual of Bacteriology, etc.

† *Trans. Odont.*, June, 1896.

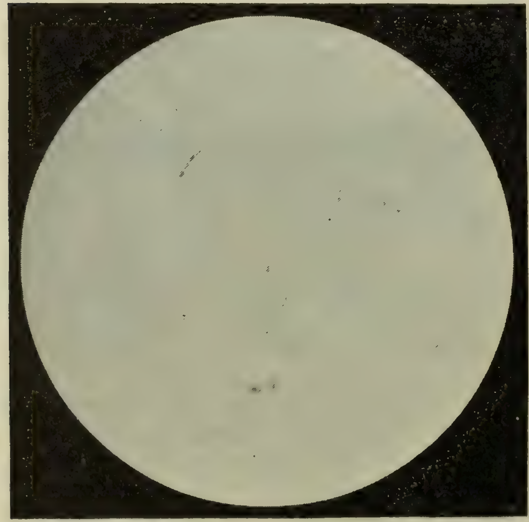
I have experienced no difficulty whatever in obtaining specimens of the fruitful heads described by Williams by staining by the ordinary Gram method, and decolorizing with chloroform and alcohol, making a careful emulsion of the material used, first in distilled water, and allowing the drop to evaporate on the cover-slip. These

Fig. 6.



Streptococcus brevis. 24 hours agar. (Diplococcal form.) × 1000.

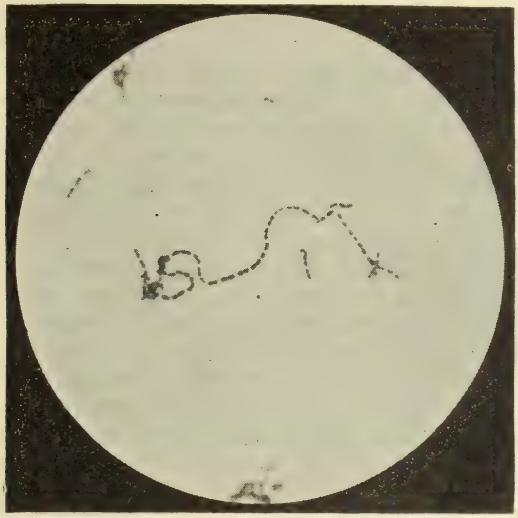
Fig. 7.



Streptococcus brevis. 24 hours broth. × 1000.

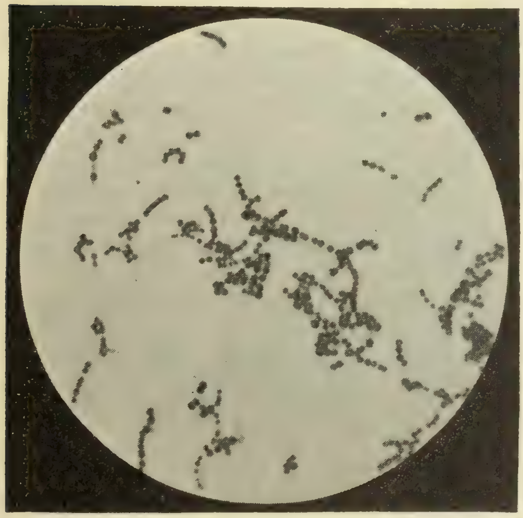
"fruitful heads" consist, as Williams has pointed out, of a mass of cocci-like bodies arranged round the whole length, or the end of a thread. The size is large, the threads being 1.5 to 2 μ wide, the thicker portions of the head 3 to 5 μ wide; there are also arranged

FIG. 8.



Streptococcus brevis. 24 hours agar. (Long form.)

FIG. 9.



Streptococcus pyogenes. 24 hours agar. From fatal case of pyemia.

around these, but quite detached, the circular masses photographed by Williams and termed transverse sections, why it is not quite clear. I shall have occasion to refer to these again.

These curious threads, with cocci-like bodies arranged round them, can be easily studied in the hanging drop direct, a method I am surprised has not been adopted by Williams, as it is one of the routine methods adopted in bacteriological work. I must confess that I was extremely skeptical at first as to the real existence of these fruitful heads, especially as the masses of cocci about a thread may easily be produced by growing a freely growing coccus like Staphylococcus aureus, or albus, in a broth culture of B. subtilis.

In order to satisfy myself and to clear up a very debatable point I conducted a series of experiments in the following way: A drop of nutrient medium, agar, gelatin, or broth, was placed upon a sterile cover-slip, inoculated with scrapings from the enamel of my own teeth, and then inverted upon a hanging drop slide ring, the edge of the ring being moistened with Canada balsam. The small plates were then examined under the microscope, and the curious forms noted by Williams and Vicentini were plainly to be seen. The cover-slip plates were then incubated at 40° C., in the case of the agar and broth, and examined at each subsequent period of twelve hours for six days, and the results compared with one another.

Subsequently an agar cover-slip plate was made in the same way and a group of heads brought into the field, and then the microscope placed in the hot incubator at 40° C., the preparations being examined at intervals of twelve hours, and camera lucida drawings made at each observation to check the development.

Several curious facts were observed.

1. There was little alteration in the general conditions for the first forty-eight hours, after which time short thread-like forms were observed growing from some of the cocci-like bodies of the head.

2. In broth the heads in forty-eight hours became in many instances surrounded with masses of cocci; in others the threads were growing from the spores, but the masses of cocci did not develop into threads. The spores showed considerable Brownian movement, but were not motile.

The threads themselves showed several curious points.

1. Some of them degenerated to a considerable extent, and showed in their interior segmentation of the protoplasm into cocci-like bodies; some of these lay outside the threads.

2. In agar and broth preparations chains of streptococci were seen growing from the cocci on the threads; on the agar plates genuine streptococcal colonies were found attached to the threads, which gave cultures of the ordinary mouth streptococcus upon subcultures being made.

In the threads which showed the attachment of streptococci a considerable erosion of the thread was observed.

The cocci were easily differentiated from the spore-like bodies.

3. The short bacilli and spirilla had no apparent connection

with the threads, and were moving freely; on agar the bacilli formed colonies.

4. Some of the threads showed branching and sporulation of the Penicillium type.
5. Eventually some of the threads underwent formation into cocci-like bodies by segmentation of the protoplasm through a large portion of their length.
6. The small clusters of spores (Williams transverse sections) showed development of branches radiating from the central masses.
7. Some threads showed pseudo-branching.

The threads are by no means all concerned in this formation of spores, and many of them belong to other species, as will be seen later.

It is somewhat interesting to note that the thread forms around which the streptococci develop and whose contour shows erosion, appear not to develop spores, so that the streptococcus would appear to be antagonistic to its growth, more particularly as on most media the streptococcus "grows down" most other organisms, as has been pointed out by Washbourne and myself.*

One point in particular is brought out by the foregoing experiments,—*i.e.* that the process of development actually watched is:

1. Spore.
2. Thread from spore.
3. Spore.

Nothing approaching a sexual method of reproduction was noticed. There is, however, no evidence to show what part, if any, this interesting organism plays in dental caries, and until it has been isolated and its biological characters studied the matter is entirely conjecture.

The term "Leptothrix racemosa" is one that may remain for the present, but the organism much more resembles the Crenothrix of Rabenhörst than anything else (see *résumé*).

Let us now turn our attention more closely to dental caries.

The subject involves *many issues*, and more particularly those relative to the *etiology of the process;* it cannot be placed in the same category as those diseases which modern research has shown are due to specific micro-organisms; *there is no* specific organism of dental decay. That the destruction of tooth-tissue is due to the activity of bacteria has been placed on a scientific basis by the researches of Miller, whose admirable pioneer work is so well known to all, *but* at the same time, although fully appreciating Miller's work, we must refrain from considering it as final. From its nature, and the wide field involved, *the work is of necessity but pioneer.*

The results, admirable as far as they go, were obtained with impure cultivations, thereby introducing one of the greatest sources of error with which bacteriological work is beset.

Under these circumstances it is of great importance to bring into focus the many side issues connected with the problem, and to

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**Trans. Odont.*, June, 1896.

determine, *not the specific organism,* but the classes of organisms, their biological, biochemical, and other characters, before we can make any further progress in the true study of dental caries.

In examining the biological characteristics of organisms which are to be found in caries, and studying their various reactions, I find that the bacteria present in tooth-decay fall into three groups:

(*a*) Bacteria which produce acid.
(*b*) Bacteria which liquefy blood-serum.
(*c*) Bacteria which produce pigmentation.

The solution of the lime-salts of the tooth is brought about by the acid-forming organisms, *which in all cases are the prime movers in the process.* The lime-salts being removed, the liquefying organisms are enabled to digest the matrix of the dentin, while, *pari passu,* the pigmentation of the softened tissue takes place.

It follows, therefore, that the chief points to be investigated in the organisms of dental caries are three in number,—*acid production, liquefaction, pigmentation;* and an organism that does not possess either of these qualifications cannot be admitted as a cause of the decay. We are thus enabled to eliminate from the innumerable species that are to be found in the buccal cavity or in decaying dentin *all those that do not bear a distinct relation to the process under consideration,* and which, although often to be found in conjunction with those causing the disintegration of tooth-substance, are only adventitious. The acid-forming organisms naturally deserve the first consideration. We must, in the first place, guard against the supposition advanced by some, that *all organisms are* capable of acid production under given favorable conditions, more particularly so as it is a commonplace bacteriological fact to which I have already called attention that the usual result of the growth of an organism is an *alkaline reaction in the culture-medium,* and that certain organisms only are enabled to reverse this condition, and to produce an acid reaction counterbalancing the usual alkaline condition. Further, some organisms, many of them well-known species, produce a very large amount of alkalinity even in media containing sugar; one organism in particular that I have isolated from the mouth on many occasions does this, a point of much importance in relation to earlier work on dental caries; the cultures used being impure and the one class of organisms neutralizing the products of the other, a very eloquent argument for the use of pure cultivations to which the pioneers in the field appear to have been deaf.

The first outcome of my investigation of the organisms occurring upon carious dentin showed that a far larger variety and quantity of organisms exists upon the surface than in the deeper layers of necrosed tissue.

The next point appears to be the somewhat curious fact that the organisms which are surface-growers—*i.e.,* aërobic—are in many instances liquefiers of gelatin; they may or may not produce acid, and many of them do not change the color of litmus milk. Most of the species I have isolated from the surface of carious dentin are aërobic liquefiers, some of them liquefying the gelatin with great rapidity, and also liquefying coagulated blood-serum. A small fraction are anaërobic liquefiers, among these latter being B. mesentericus (ruber, vulgatus, fuscus). Many of these organisms found upon the surface have the power of producing a brown discoloration of the media in which they are cultivated, especially upon glycerol-agar and potato.

The organisms which I have isolated from the deep layers of caries are mostly anaërobic, though facultative aërobic, and produce acid rapidly when grown in litmus milk or glucose media; they do not as a rule liquefy gelatin, and do not discolor the medium.

Miller's work on the destruction of the tooth-substance by bacteria is so well known that I have not considered it necessary to repeat his experiments in this direction; however, one point required clearing up, as Miller experimented with impure cultivations,* and his results were general. He has well shown that the process of caries is always preceded by a destruction of the calcium salts by the acids produced by the organisms, a matter that my experiments confirm, as will be seen later.

I thought, however, that it would be interesting to determine the specific action of liquefying organisms upon dentin, for it must not be supposed that all organisms capable of liquefying nutrient gelatin also possess the power of digesting the decalcified tooth-cartilage or chondrinogen, a point well brought out in the following experiments:

Slices of healthy teeth were decalcified in ten per cent. hydrochloric acid in distilled water, and when entirely decalcified were washed in ten per cent. solution of ammonium hydrate, subsequently in sterilized water.

The slices were then placed upon the surface of nutrient media, and the tube inoculated with a pure cultivation of a liquefying organism. Uninoculated control tubes were also made.

Three organisms were employed:

1. B. furvus (Goadby), liquefies blood-serum and gelatin.
2. B. mesentericus fuscus, liquefies blood-serum and gelatin.
3. B. plexiformis (Goadby), liquefies gelatin; blood-serum not affected.

All of them isolated from the surface of carious dentin.

The media used were agar, blood-serum, gelatin (agar and gelatin, three cc. normal NaOH per liter alkalinity).

I must point out at this stage of our inquiry that the question of examination of superficial and deep layers is of first importance; and I have found, in all cases examined, that by far the larger quantity and species of organisms are to be found *in the superficial layers*, a fact naturally contingent upon the general bacterial conditions of the mouth. The method adopted for obtaining cultures from the deep layers was similar to that used in making cultivations from the bodies of infected animals.

Extracted teeth were used in all cases to minimize the difficulty

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*Not *mixed cultures* of organisms, but *impure cultures*, the organisms present not being determined by the ordinary bacteriological methods.

of sterilization, red-hot instruments being the only reliable method. Thus:

1. The tooth was taken to the laboratory immediately after extraction and the superficial layers of decayed dentin seared with a hot instrument.
2. The surface was next removed with a sterilized instrument and the fresh surface again seared.
3. Another layer was then removed and cultivations made, as well as cover-slip preparations.

By this procedure surface contamination is avoided, and the organisms isolated are those *that occupy the van of dental decay in the deep layers.*

In forty-eight hours in 1 and 2 upon blood-serum the slice of dentin was considerably softened.

In four days the slice was entirely liquefied. The reaction of the medium was strongly alkaline.

With the third organism no liquefaction occurred, although the growth was considerable in both serum and agar tubes.

Upon gelatin no liquefaction of the dentin occurred even when a decalcified slice was hung for seven days in the liquefied medium.

The control tubes were unaltered, and showed no growth.

From this it follows that liquefaction of dentin may be caused by the digestive enzymes produced by certain bacteria, and that an organism, although having the power to liquefy gelatin in the culture-tube, does not therefore possess the power of liquefying dentin.

So far as I can find, no other observers have made this extremely simple experiment, which is of considerable importance in the pathology of dental caries.

In making cultivations from the deeper layers of carious dentin I have so often met with one organism, a bacillus often in pure culture, that its relation to the carious process cannot be entirely accidental; and, as several of its characteristics fit in with the process of decay, it is important to describe it in this connection.

Ordinary laboratory media are adapted to its growth.

The direct preparations showed short, thickish bacilli, often in almost pure culture, which stain deeply by Gram, as well as some fine bacilli, cocci, and commas, the cocci being arranged as diplococci.

Broth cultivations were also made at the same time.

In thirty-six to forty-eight hours a slight growth of minute round, gray-white translucent colonies developed upon the surface of the agar. Cover-slip preparations made from the colonies show a mixed growth of Streptococcus brevis and the bacillus I am about to describe.

In the broth tubes the growth is mainly streptococci, although a few of the bacilli may also be found. The cultures were then plated and a pure colony of the bacilli picked out and streaked on to the surface of agar.

From the situation in which this organism is found Dr. Perry, of Guy's Hospital, has suggested to me the name of B. necrodentalis.

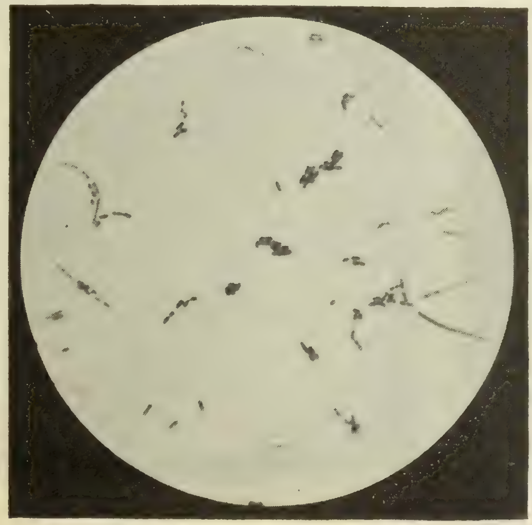
The organisms were isolated in this manner from twenty cases of caries, the organisms having the same general characters as follows:

BACILLUS NECRODENTALIS.

Morphology.—Short bacilli 75 μ wide, 1 to 5 μ long, often associated in pairs and sometimes in chains; the ends of the bacilli are rounded or square.

The bacilli tend to involute rather rapidly and produce swollen S-shaped contorted masses, not unlike the involution forms of the streptococcus. In broth the forms are extremely like cocci, especially in the hanging drop, owing to the shortness of the elements; this is particularly well marked when in the form of chains (streptobacilli). The bacilli are slightly motile on aërobic cultures, but more so on anaërobic ones.

FIG. 10.



B. necrodentalis. 48 hours agar. (Gram.) × 1000.

Staining Reactions.—Stains by Gram's method, and by ordinary anilin dyes; with difficulty by methylene blue.

Many lightly stained involution forms are to be seen on three-days' old cultures on agar. No partial staining or polar staining has been noticed. Spore formation has so far not been observed.

Biological Characters.—Anaërobic facultative, aërobic non-liquefying, slightly motile bacillus. Non-chromogenic.

1. *Gelatin Plates.*—In three to five days minute pin's point colonies may at times be seen, very similar to streptococcus colonies.

2. *Gelatin Streak.*—Slight dotted growth of minute colonies along the streak in three days; no liquefaction of gelatin occurs.

3. *Gelatin Stab.*—Three days, slight dotted growth to depth of stab, no marked surface growth; no liquefaction in three weeks.

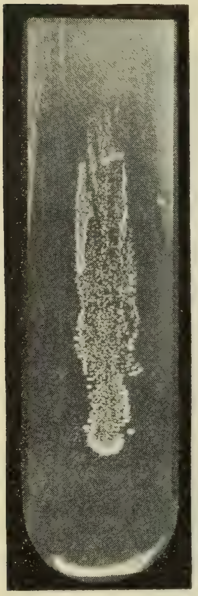
4. *Gelatin Shake.*—Five days, cloud of minute whitish-gray colonies; no liquefaction of medium.

5. *Broth.*—Twenty-four hours, slight general turbidity with precipitate which may be stringy on giving the tube a circular shake. The turbidity increases very little, but the precipitate increases considerably in forty-eight hours.

6. *Potato.*—Forty-eight hours, very slight shining appearance. Cover-slip shows presence of bacilli, with considerable involution.

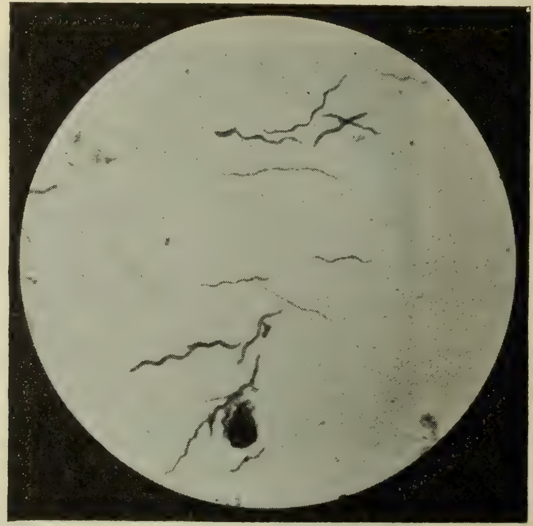
7. *Litmus Milk.*—Twenty-four hours, no change in medium. Forty-eight hours, solid clot, with the lower portion decolorized, the top showing a strongly acid reaction. The clot does not become redissolved.

FIG. 11.



Streptococcus pyogenes. 24 hours agar. Appearance similar to 48 hours B. necrodentalis.

FIG. 12.



Spirillum sputigenum. Spirillum form (mouth direct). × 1000.

8. *Agar Streak.*—Twenty-four to forty-eight hours, slight grayish, translucent, dotted growth which never develops very much more. Typical short, thick bacilli.

9. *Blood-serum.*—Very little growth, flat, almost invisible.

Indol.—None in seven days.

Gas.—None observed.

Anaërobiosis.—Grows best when oxygen is excluded in ordinary anaërobic tubes, and especially on glucose media. Scarcely at all on blood-serum.

On agar the colonies are,—

1. Macroscopically; gray-white, round, and regular, or slightly wavy with a slight central prominence.

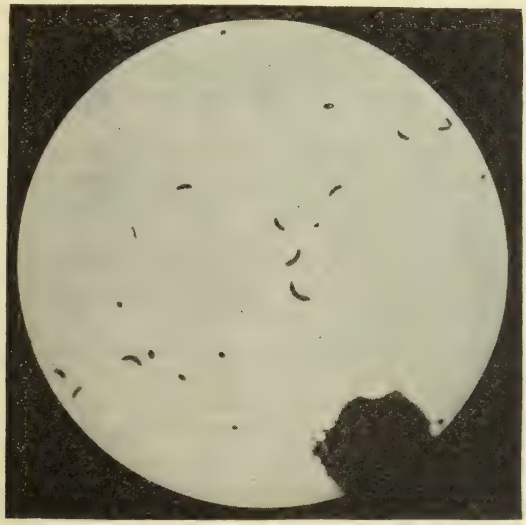
2. Microscopically; brownish with slight central dot, regular edge, and faintly granular.

In almost every case, sixteen out of twenty, I have also obtained the Streptococcus brevis, and as both these organisms are facultative anaërobes, B. necrodentalis especially, and from the power they have of acid production they appear to be largely concerned in the decalcification of the matrix, prior to the disentegration by other organisms.

The other forms noticed have not so far been isolated upon the ordinary media.

The organism, as will be seen from the photograph of the agar culture, is remarkably pleomorphic even before involution forms have formed.

FIG. 13.



Spirillum sputigenum. Comma form (mouth direct). × 1000.

Arkövy, of Budapest, published in the *Vierteljahrsschrift für Zahnheilkunde* (xiv Jahrgang, Heft III) an interesting paper upon "Chronic Alveolar Abscess and its Bacteriology." He has found in all cases a bacillus which also appears to be the cause of gangrene of the pulp, and has named the organism B. gangrænæ pulpæ. This bacillus he has also found in decayed dentin, but does not say if in the depths or surface. It liquefies blood-serum and gelatin, and is facultative anaërobic, but it does not produce acid.

So far I have unfortunately failed to obtain a cultivation of this organism from dentin.

Arkövy also gives a list of organisms found in dental caries which is most confusing, as the organism *placed second on the list is of extreme rarity in the mouth (B. pyocyaneus)*, while the organism *placed eighth* is one which has only been found once in the mouth by Dobrzyniecki (see *Centralblatt für Bak.*, Band xxi, 1897). Such a list is of small value, for reasons already pointed out.

A list more to our purpose is one of the acid-forming organisms which may be found in dental caries, *and in order of their average frequency.*

Arkövy's list does not assist us here, as it is relative to the frequency of organisms in alveolar abscess, not in dental caries.

Miller's meager biological characteristics leave us quite in the dark as to most of the organisms isolated.

One of these, Micrococcus nexifer, is without doubt the ordinary mouth streptococcus *(S. brevis).*

Another, as Miller points out, probably *V. Finkler-Prior.*

A third, Bacillus ε of Miller, I have not as yet obtained cultures.

Vignal and Galippe described six varieties of organisms from decayed teeth (*L'Odontologie,* Mars, 1889), acid production not referred to. One of these organisms, a coccus, is probably the Sarcina alba of Eisenberg.

Vignal's researches deal more with mouth bacteria than with dental decay. He places the two Staphylococci (aureus and albus) last on the list in point of frequency.

Black claims to have found *staphylococci much more* frequently, also Micrococcus continuosus (Streptococcus brevis).

Netter only found *Staph. pyog. aureus* in seven cases out of one hundred and twenty-seven.

Biondi describes a staphylococcus, *Staphylococcus salivarius pyogenes,* which resembles the *S. aureus* in many ways, but certainly differs from it in many respects.

I have found a staphylococcus closely resembling that described by Biondi in many mouths, and I am of opinion *that it is this organism many observers have classed as the S. py. aureus.*

The following list gives the organisms whose *acid production* is known or has been demonstrated, which occur with tolerable frequency in dental caries. Those whose occurrence is rare or infrequent have been omitted:

A.—Acid-producing Bacteria in Dental Caries.

1. Streptococcus brevis } from the deeper layers.
2. B. necrodentalis }

1. Streptococcus brevis, synonyms M. continuosus (Black) }
    M. nexifer (Miller) }
2. Sarcina alba (? S. alba of Eisenberg), Micrococcus albus
3. Sarcinæ lutea, Staphylococcus albus
4. Sarcina aurantiaca
5. Staphylococcus pyogenes aureus and citreus
    " " salivarius (Biondi)
} Superficial layers.
6. Spirillum sputigenum.
7. B. max. buccalis.

I have isolated a good many other acid-forming organisms which occur occasionally, but have not yet fully examined them all.

(To be continued.)

FURTHER REMARKS ON LEPTOTHRIX RACEMOSA AND THE CRYPTOGAMIC FLORA OF THE MOUTH.

BY F. VICENTINI, M.D., CHIETI, ITALY.

I WAS not aware of Dr. Williams's paper read before the New York Odontological Society, January 17, 1899 (published in the DENTAL COSMOS, 1899, pp. 317-49), until last October, and I then made haste to congratulate the author upon his valuable contribution and beautiful photographs as well as for his frank sincerity relating to the priority of my work; though I may state that my first *"discovery,"* as he calls it, of the organism in question dates from March, 1890 (see p. 125 of the work) rather than from the issue of the English edition in 1897.*

I now take the liberty of presenting some comments on Dr. Williams's paper, but for the better understanding of this note I will reproduce here the short reply I made in the *Medical Age,* October 10, 1898, pp. 187-89, to the criticisms and objections advanced against my work by Professor Klein and others, for the reason that some of Dr. Williams's remarks coincide with the same. It was as follows:

"Those who are acquainted with my work upon the cryptogamic flora of the mouth will remember that in its fourth part I answered some objections that had been urged on the appearance of its Italian edition. I now desire to add a few words regarding some objections which have been advanced on the appearance of the English translation.

"It has been said by Professor Klein that my book might have had some *raison d'être* fifteen years ago, if it had dealt with the purely microscopical examination of the size and shape of microorganisms of the sputa and of the mouth, prior to the introduction by Koch of exact methods of bacteriological study, but that it possessed none at the present time. From this the reader might infer that my descriptions included only the severed or inferior forms of bacteria hitherto known, no mention being made in Professor Klein's paper of the superior phases (fructification by ears, pseudo-inflorescences or male organs), as described by me for the first time, in the bacterial growths of the mouth and sputa.

"What are bacteria in themselves, and what is their nature? Are they complete beings as they appear in artificial cultures, or are they, in fact, simple scattered particles of more complex beings?

"These are the questions which our opponents do not seem to take into consideration at all, although a process of ramification and of morphological evolution toward the higher fungi had been detected or foreseen by the same Professor Klein and others in tubercular bacilli. I was led, by my daily clinical examinations of the sputa, to consider bacteria not only in their scattered or rudimentary forms, as they appear in laboratory specimens, but also in their further development, and connection with the higher cryptogamic flora, as under favorable conditions they occur in Nature.

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*"Bacteria of the Sputa and Cryptogamic Flora of the Mouth." By F. Vicentini. With four colored plates and a preface by Professor W. D. Miller, of Berlin. Bailliere, Tindall & Cox, London, 1897. The Italian edition was divided in three memoirs read before the Medical Academy of Naples; the first in 1888, the second in 1890, and the third in 1892. The fourth memoir, or appendix, was not published in the Italian language.

"The question is 'a burning one,' as the *Medical Age* said in a brilliant review of my book. In this lies the *raison d'être* demanded by Professor Klein. At any rate, this was my reason for resuming this morphological study, begun by the first investigators and abandoned by modern bacteriologists, as stated on page 159 of the work.

"Rather than inquire if my views were more or less orthodox, according to the current doctrine of the day, my opponents should have begun by a practical verification of the facts alleged by me, which, according to the *Medical Age,* were the result of a quarter of a century devoted almost exclusively to the study of bacteria, those of the mouth and respiratory passages particularly. The evidence of the existence of these is of such a character that it demands careful consideration, and doubtless will lead to changes in classification.

"I regret that, with the exception of Mr. Mummery and Professor Miller, none of my critics alluded to should have turned his attention to this matter nor upon my subordinate considerations, that seemed to the *British Medical Journal* to constitute an exceedingly suggestive chapter, although Professor Klein rebuked them as an anachronism of extinct type. Few people, I think, will concur in the opinion of the learned professor. The life history of bacteria cannot be understood until we have knowledge of them, except as cursorily seen in the field of the microscope or under the artificial conditions of laboratory propagation and culture, as the *Medical Age* opportunely said.

"I will not further deal with Professor Klein's paper. I add only that my 'tremendous courage,' according to him, will always be found to be tempered with modesty and diffidence according to *The Lancet.* In regard to the remarks of *The Lancet* itself upon my views relating to the classification of the bacterial species, the explanation just given will suffice.

"While thanking the kind critic of the *British Medical Journal* for his indulgent review, I must add that I did not intend to hinder all the particular characteristics of the various types of bacteria. While investigating their morphology I was looking upon them as a cryptogamic group of a more complex structure than it was before supposed.

"I am sorry to say that the critic of the *Daily Chronicle* seems to have so thoroughly misunderstood my doubtful suggestions about the normal presence of bacteria of the mouth and mucous membranes as to regard my views as alarming. My ideas, if confirmed, would, on the contrary, safely warrant us against any fear of bacilli. (See Hypothesis of the Author on the Action of Bacteria upon the Human and Animal Economy, pages 206-16 of the book.)

"In a further paper Mr. Mummery repudiates the hypothesis that eventual infection in a whooping-cough is by myelin, because, he says, this is a waste product eliminated by the organism. But I venture to ask, Are not inoculable cultures also to be regarded as so many waste products of elimination?

"In regard to myelin, it was objected before the Royal Institute of Venice that the abundant flow of this substance, as described by me in some cases of whooping-cough, would be found to be out of proportion with the limited respiratory area invaded by the disease. It will suffice to refer my opponents to the calculations of Sée, who since 1886 estimated our respiratory surface at an amount of eighty-one square meters—*i.e.,* fifty-four times the whole surface of the body.

"The surprise aroused in the unprejudiced mind of the critic of the *Medical Press and Circular* from my doubt about some eventual affinity between the B. anthracis and B. subtilis will cease, I think, as soon as he remembers that such an opinion was not my own, but many years older.

"REFERENCES.

"E. Klein: *Nature,* March 11, 1897.

"The *Medical Age,* April 26, 1897, pp. 241-42.

"J. H. Mummery: Transactions of the Odontological Society of Great Britain, January, 1894, pp. 73-81; and *The Lancet,* February 24, 1894, pp. 487-88. For Miller's part see the preface of the book, p. viii, and Fig. 31, p. 187.

"*British Medical Journal,* July 10, 1897, p. 87.

"*The Lancet,* March 20, 1897, pp. 814-15.

"*Daily Chronicle,* February 11, 1897.

"J. H. Mummery: *Journal of the British Dental Association,* May 15, 1897, pp. 319-23.

"*Atti del Reale Instituto Veneto,* tomo ix, Serie VII, 1897-98, p. 1132.

"M. Sée: Sur la mesure de la surface respiratoire du pou mon, *Bulletin de l'Acad. de Méd.,* 1886.

"*Medical Press and Circular,* April 21, 1897.

"Friedlaender: Die Identität d. Bacillus subtilis u. B. anthracis, *Centralblatt f. Med. Wissensch.,* 1880."

Besides the above reviews, some others were given upon my work in *Journ. of Microscopy and N. S.* (1891, p. 162; 1892, p. 214; 1893, p. 436); Baumgarten's *Jahresbericht* (Jahrg. 1891, S. 436); *Transactions R. M. S.* (1891); *Archives italiennes de Biologie* (1893, pp. 316-17); *Proceedings of the American Microscopical Society* (1893, pp. 156-58); *Atti Accad. Nuovi Lincei* (Tomo 46°, Agosto 1893); *C. R. de la Société de Biologie* (Oct., 1893, pp. 838-41); *Atti Accad. Med. di Roma* (30 dic. 1893); *Centralblatt f. Bakt. u. Parasitenk.* (1894); *Charlotte Medical Journal* (Feb., 1897, p. 107); *St. Louis Medical and Surgical Journal* (March, 1897, p. 175).

Hence it will appear that the indifference of the scientific world to my humble work (so highly regretted by Dr. Williams) was not really so general as it seemed to him. Only it might be regretted that the above reviews were, in their majority, neither objective nor practical enough, and that (with the exception of Mr. Mummery's and Professor Miller's first trials) *the practical verification of the facts alleged by me* (what I asked firstly in 1890, p. 129 of the work, then in 1895, *ibid.* pp. 187-88, and lately in the reprinted "Reply") remained, as it were, unattempted till the communication of Dr. Williams. The evidence exhibited by him came now to fill up this blank in relation to the *fructification forms,* and I hope that, in their turn, the *male organs* and other appurtenances of the same organism will be also taken into consideration by observers.

The difficulty which my work presents to the majority of modern bacteriologists, in that it does not center about the culture and inoculation methods, is to-day quite natural; but Dr. Williams seems to disregard this consideration, where he ascribes their indifference to the facts alleged by me, to my claim "for this parent organism, with more boldness than wisdom, as the source of *all* the bacteria and bacilli found in the sputa."

Now, in the first place, I did not go so far; nay at p. 189 of the work, I said, "Professor Miller, besides, attributes to me as a firm and full conviction what I simply suggested as doubtful and hypothetical,—viz, that a great proportion of the bacteria, which are prolific in the mucous membranes, might proceed from a common stock. But I emphatically state that a definite opinion upon that subject would at the present moment be premature."

In the second place, Dr. Williams himself seems to concur in my opinion as to an eventual simplification of the bacterial species, where he says, "The tendency with the pathologist, who is chiefly concerned to find a specific cause for his disease, to regard every separate form of micro-organism which appears constant under a single method of cultivation as a distinct species is perhaps quite natural, but there is not room enough for the truth in any theory which is not large enough to contain *all* of the facts. The problem of the pleomorphism of fungi is intimately associated with their methods of reproduction." (DENTAL COSMOS, p. 333.)

At any rate, that an "enormous number of micro-organisms of different forms and sizes which are being constantly shed into the mouth by this parent organism have been classified as permanent species" (*ibid.*, p. 346), is the *capital fact* pointed out by me and that we find now accepted by Dr. Williams.

In the third place, it is to be shown, by further researches, whether some other forms of bacteria, which were assumed but not yet proved to be so many independent species (the so-called pathogenic micro-organisms, for instance; the tubercular bacilli being not excluded), may even, in their turn, be recognized as so many particles, cells, or series of cells, belonging to other complex fungi or algæ, like our *Racemosa,* though hitherto unknown.

I would respectfully observe that my skepticism regarding the so-called pathogenic bacteria is not perhaps so strange an eccentricity as the modern bacteriologists may pretend. I gave in the above work examples of some authorities, in the field of medicine, who hold the same opinion as mine, but a more striking one is that of Dr. Bantock, in the field of surgery. See his address before the British Gynæcological Society, March 9, 1899, of which I gave an Italian translation, the last August, in the *Gazzetta Medica* of Rome.

Dr. Williams himself seems to entertain some doubts on this subject where he says, "The suggestion, which Vicentini and others have made to the effect that the pathogenic qualities of bacteria are probably acquired and not necessarily permanent, should have the most careful consideration." (DENTAL COSMOS, p. 349.) This means, in other words, that the same supposed pathogenic qualities of bacteria cannot be assumed, in any way, as the true distinctive criterion of their species, as I suggested in several passages of the work.

Those who are acquainted with this work may easily find also that Dr. Williams, after a year of study, has entirely done justice to my descriptions of the fructification forms, illustrating them more nicely. Contrarily to the unfavorable opinions of Professor Klein and the other critics alluded to, he emphasizes that the "discovery" of the new organism "must be regarded as the most important in the entire history of the bacteriology of the human mouth, and one which, he believes, is destined to profoundly modify our entire conception of this whole subject." (DENTAL COSMOS, p. 335.)

This will be found perhaps an exceedingly indulgent appreciation. But several of the remarks of the author are so interesting that I will deal with them particularly.

"That hundreds and, it may be said, thousands, perhaps, of expert bacteriologists should have worked for years at the subject without discovering this important micro-organism," as Dr. Williams says (p. 348), is a fact which can scarcely be explained by the method of mounting in balsam (the reason alleged by the author), when we take into consideration that fundamental misconception of the modern bacteriology about the *botanical entity* of bacteria, by which the latter are assumed to-day as simply monocellular organisms, without any suspicion that they might be, on the contrary, as many scattered or rudimentary particles of more complex ones. Hence the carelessness in collecting the patina,* and its excessive trituration for staining and mounting, as I touched upon at pp. 94 and 139 of the work. The method of scraping by a sharp, sickle-shaped instrument, adopted by the author, does not differ substantially from that, by a bent needle, adopted by me. To abrade only the *upper layers* of the patina is the essential caution in both cases.

Around the fruitful stalks of *Leptothrix Racemosa,* I described six rows of spores, and Dr. Williams comes now to confirm this fact as the rule, at least in the great majority of the cases; but in some instances he found twelve or more rows, and gave illustrations of them at the time. This may be due to the better images given by photography, and we have nothing to object against it. But some of the cross or transverse sections photographed by the author might have been caught foreshortened,—*i.e.,* in an oblique section rather than in the normal one, and have thus acquired the appearance of an increased number of spores.

Apart from the specimens given in the above illustrations, another fact may happen, as follows. In Fig. 30 and pp. 179, 200 of the work, I described an accidental superposition or accumulation of adventitious cocci, like a *wrapping-cap,* on some *ears,* probably due to the pressure of the lips. Now, some remains of this wrapping-cap still adhering to the *ear,* in that point where the latter was crossed or ruptured, may, in their turn, give rise to analogous appearances of an increased number of spores.

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*Materies Alba of Leeuwenhoek; Bacterial Plaque of Black.—ED. DENTAL COSMOS.

On account of the *peduncles,* I spoke, at pp. 222, 223 of the work, upon the comparative value of the apochromatic object-glasses and the one-twenty-fifth-inch achromatic objective I made use of, for this special research, and will not repeat here this comparison, which would carry us too far. That with the above apochromatics the peduncles may be seen is a fact, though the more striking grape-bunch appearances in iodin solution are almost unappreciable under these lenses. But, on the other hand, we have to consider the fact that neither Mr. Mummery nor Professor Miller succeeded in seeing the peduncles, and that lately Mr. Kenneth W. Goadby, of Guy's Hospital, London, to be frank (as he wrote me), never succeeded in ascertaining these sterigmata. Thus, so far as I am aware, Dr. Fort, of Atlanta, Ga. (see DENTAL COSMOS, 1899, p. 741), was the only observer who, after Dr. Williams, succeeded in seeing the sterigmata in question. And, as far as the apochromatic lenses prove the most successful in photography, and the impression of the light upon the negative film is more durable than on our retina, we may understand the magnificent evidences given by Dr. Williams. This notwithstanding, I am still of opinion that for the direct observations the one-twenty-fifth-inch objective will prove the most suitable.

On the other hand, the ratio of the penetrating powers—viz, the *depth* of foci—is inversely as the squares of the same foci, so that a one-twenty-fifth-inch, with one millimeter focus, will possess only one-fourth of the depth of a 2 mm. lens, and one-ninth of a 3 mm. one. Hence, under the one-twenty-fifth-inch, we see that the single planes of any even very minute object must be separately perceived, one by one, by focusing; while under a 2 mm. lens more depth is reached in each position of the screw. This works so that, in these photographic images, different planes of an object, which are superposed the one upon the other, may appear at nearly the same level, as in Fig. 34 of Williams (magnified to 9000 diameters from an enlarged negative), where we cannot be sure whether the different spores and peduncles there depicted lie in a same plane or in different and superposed ones.

Dr. Williams states that the sterigmata arise from the central protoplasm of the stalk, and that a thin thread of germinal matter passes from the inner part of the stalk to the inner one of the spore, through the peduncle. And we have nothing to object, this being the case as well in other fungi, even with septated *hyphæ,* and an arrangement of the same kind may be seen in Fig. 24 of my work. But I dare observe that the above outward sprouts of germinal matter have nothing to do with the *reserve gemmules* described by me as ending in an endogenous formation of bacteria into the sheath. This inward formation takes place only in *truncated stalks,* which being precluded from forming the fruits, and having strayed from their higher function, return to the lower degree of merely vegetative organs, through the increase of the granules contained into the sheaths.

The explanation given by the author, on account of the shortening of the peduncles, in *Leptothrix Racemosa,* and of the compact shape of its fruits, owing to the want of space and the rough usage to which this fungus is exposed in the mouth, seems a very plausible one. Some doubt, on the contrary, may arise about the statement advanced by him, that certain spore bodies begin to multiply by fission before they become detached from the parent stem. Though this anticipated germination would corroborate my views on the multiplication of the spores, it is to be considered whether the superposed bodies of Dr. Williams are as many new buddings rather than simply adventitious cocci fallen on the fruits from the surrounding vehicle.

The branching form, drawn in Williams's Fig. 9, recalls just the Fig. 9 of my work, although no mention of this analogy was made by the author. I was inclined to believe this arrangement to indicate a kind of radical system, like *haustoria.* See page 116 of the work.

On account of the beaded threads, I think they do not constitute a different species, and will recall the fact, pointed out also by the late Professor David, of Paris, of the continuity between the chains and some filaments. (See the same Fig. 9, and pp. 117, 155 of the work.) Space will not permit me to recall here my descriptions of the *male organs* and other appurtenances of *Leptothrix Racemosa.*

It may be regretted that Dr. Williams makes no mention of the involving *glia* or *glair* upon the fruits as well as around the stalks.

Staining with methyl blue was commended even by me for its transparency, at p. 220 of the work. But I am of opinion that neither iodin solution nor gentian violet, for direct observations, should be abandoned, chiefly for detecting some special features. It happened perhaps for his method of staining with methyl blue that Dr. Williams may have passed over the *ears* with a *dual zone of colorization* (like in Figs. 27 and 32, and pp. 173, 217 of the work), though in Fig. 18 of the author we may guess, toward the right side, an exemplar of this kind.

On the *matrix of Leptothrix* I gave some hints toward the end of the book, and will again deal with it on another occasion.

In order to obtain cultures of *Leptothrix Racemosa,* see the quoted paper of Dr. Fort, DENTAL COSMOS, *loc. cit.,* p. 741.

In conclusion, I am pleased that these various facts have now invited the attention of the observers on the new organism, and will be glad if my first attempts may give rise to further studies on the subject, hoping, as I said at the end of the work, "that other observers (more learned in the study of mycetology and algology) may carry them farther, and, if necessary, correct them, advancing them to a degree that my limited private means and daily duty in my medical practice did not allow me to reach."

DENTAL EXAMINERS AND THEIR QUESTIONS.

BY RICHARD GRADY, M.D., D.D.S., BALTIMORE, MD.

(Read before the Pennsylvania State Dental Society, July 11, 1899.)

VARIOUS circumstances continue to make dental examining boards and their questions prominent at this time. In three states a public record of examination questions is a matter of law. In Pennsylvania, I have been informed, it has been found a most desirable feature. In Maryland, after the officers of its dental board had attempted to include in the law the words, "but no examination papers shall be open to the inspection of any person whatsoever save the members of said board," and the State Dental Association, upon whose recommendation the dental board was appointed, had voted that "all examination papers shall at all reasonable times be subject to inspection by members of the Maryland State Dental Association and by the candidates," the dean of one of the dental colleges wrote to the president of the board requesting a copy of the questions used in the last examination. The president replied that the board had decided not to make public the questions. "It however developed that the dean of the college at which the examination was held was given the questions at or about that time. It is hard to imagine what reasons the board might give officially for this piece of gross injustice."

Such a revelation has seldom been made. As writer of the existing dental law of the state of Maryland I made a strenuous protest against the injustice, considering the refusal a confession of moral and mental weakness. So far the act has been without an apologist or defender.

Liberality, generosity, culture are associated with professional life. The sensitiveness that resists publicity is too fine a thing for this rude world. Any one who accepts public office challenges criticism, and abandons his right to be let alone so far as his work is concerned. Even the President of the United States, or any lesser public official, is always a proper subject for fair criticism upon the part of any citizen not in official position. Why can't examiners have the courage of one in another state who said, "I think that sentence is a slur on the Board of Examiners direct. The examination papers, the answers, and everything pertaining to the examination of applicants are on record. Any dentist in this state can come to my office and see them. They are there, every question and answer."

The rules of the Maryland State Board of Education provide, "The examination shall be in writing as far as possible; and the work shall be duly filed and preserved for two years, subject to inspection by the members of the County School Board and by the State Board of Education or their order; and the percentage of questions answered in each branch shall be marked on the examination paper and recorded in a book provided for the purpose."

The law of Pennsylvania requires: "Said examinations shall be conducted in writing, and shall embrace all of the subjects named in Section 9 of this act. After each examination the board having charge thereof shall without unnecessary delay act upon the same. An official report of such action, signed by the president and secretary and each acting member of the said Board of Dental Examiners, stating the examination average of each candidate in each branch, the general average, and the results of the examination whether successful or unsuccessful, shall be transmitted to the Dental Council. The said report shall embrace all the examination papers, questions and answers thereto. All such examination papers shall be filed in the office of the Secretary of Internal Affairs, and kept for reference and inspection for a period of not less than five years."

And the Maryland Board of Medical Examiners said (referring to the State Medical Association in these words, "To this faculty we concede all right and power; we are your servants, and to you we are responsible"), "Since the organization of the Board of Medical Examiners there has been published annually in the *Maryland Medical Journal* a summary of the results of the examinations. . . . With this summary, and constituting a part of it, the questions submitted to the applicants have always appeared. . . . It was thought that those submitted would sufficiently present to the faculty the character and scope of the examinations, and likewise furnish the necessary basis for criticism."

In an old story, from the little box upon the seashore, carelessly opened by fishermen, arose a towering and haughty demon, ever more monstrous and more threatening, who would not crouch again. So it would seem that some dental boards, created by dental associations, grimly sneer that the associations can't help themselves, and nothing can be done.* But greater things have been

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*"How sharper than a serpent's tooth it is to have a thankless child."

My paper was read July 11, 1899, and hardly a week had passed before these sentiments were uttered, as recorded in an editorial in *Items of Interest*, October, 1899, which is quoted in part as follows:

"Perhaps the most significant feature of the situation is the unique claim that the Dental Commission of New Jersey is not, as Dr. Adams puts it, 'amenable' to the state society.

"Have these gentlemen forgotten how they obtained their preferment? Was it not through the votes of their fellows in the state society? Had they expressed these views prior to election would they have been elected? Is it conceivable that a state society would choose as examiners men who would not be 'amenable' to the parent body? Is it probable that when the great state of New Jersey placed the selection of the dental examiners in the care of the State Dental Society it meant the state society to have no further control over their acts? The view is not tenable, since the state not only intrusted the society with the power of electing these gentlemen, but it likewise gave the society the option of not re-electing them.

"The principle as enunciated by this New Jersey Commission is too revolutionary to be sanctioned by the profession at large. A public officer must always be responsible to his constituents, and should give ear to their desires, even though it be true that the constituency cannot actually control his legal acts. Where an official does contrarily the voter may wait for the next election, or he may seek the removal of the objectionable individual. Thus the New Jersey Society having elected its commission, and the Goverdone than returning to the early practice, and will be done by the profession, without further legislation, if the members have not lost their convictions, their courage, and their common sense. Patience is all that is needed, and a bond of mutual helpfulness.

There ought to be no ground for the charge of favoritism or intentional injustice. Publicity of the examinations makes favoritism impossible. Nothing could be more democratic. The test completed, the examination papers, with their marks, are preserved for the inspection of those interested. It is a mistake to suppose that only the examined applicant is tested. The questions and the marks will show whether the candidates have been subjected to the examination of men ignorant of the proper methods of examination, —covered with the dust of a by-gone generation, and ignorant of the subjects in which they are supposed to examine. The most competent and suitable men are not those usually appointed upon dental boards. Those most capable are loth to seek a commission or to engage in a selfish scramble for a place in competition with others who employ the arts of the petty politician to secure the place, whether competent or otherwise. It ought to be expected, too, that the profession itself would eschew petty politics in making recommendations, if it has the privilege, and have no contention except to determine who can best perform the duties.

As far back as 1855, when the first examination of the English civil service was held, Lord Palmerston, prime minister, under whose auspices the system was inaugurated, yielded to the rule that examination papers were not only open to his inspection, but to the inspection of all others; and at the outset the fairness and impartiality and value of the examinations were established. The stimulus the published questions would give to the college quiz and as a preparation for the examinations of dental boards, whose character and scope would be known, are valuable results to be expected.

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nor having appointed them, it is conceivable that if the state society should 'recommend' the removal of one or more of its commissioners the Governor might heed the message. In this view of the matter are the New Jersey Commissioners 'amenable' to the state society?

" 'At our last state meeting the statement was made by one of the members of the board that the board is superior to and independent of the state society. That will never do, for the members of the state society elect the members of the board, and the Governor commissions them. . . .'

" '*I do not consider that we are amenable to the state society.* We are a state organization appointed through the recommendation of the society, and I do not understand that we are responsible to the state society.'

" 'I want to bring forward a point which seems to me of the utmost importance.

" 'It has been said that the state board has nothing to do with the state society, that they are an *independent* body. Our society nominates and elects the members of the board; the Governor merely acts in a ministerial capacity, and gives the members their commission. In New Jersey it is not, as in some states, a political appointment made by the Governor, but the men whom the members of the society think are best adapted are nominated and elected, and then the Governor in his ministerial capacity gives them their commissions.'

" 'When the society finds that they (the board) are superior to the society, and that it does not control the board, there will be a change when election time comes.' "

There has as yet been no method devised to prove the competency of the men who constitute the boards of dental examiners,—"the keepers of the portals into dental professional life." Our difficulties arise whenever we attempt to determine upon whom the responsibility rests. There are no means provided to restrain dental examiners from rendering unjust decisions. They are practically a law unto themselves, with no supervising power to control their actions. They cannot be too well equipped for their places. A right conception of their function will remove current criticism. Examining boards ask a number of unpractical questions which members of the boards could not answer, and require answers that are not always correct and were not given in the school instruction. As was remarked by a writer respecting an examination in Maryland, "Manifestly the examiner was not familiar with questions. That students who gave the correct answer should be 'turned down' is an unpardonable injustice to the men. The writer believes it would not be a bad plan to examine into the scientific qualifications of would-be examiners before appointing them to such autocratic positions."

Can it be believed that, if questions submitted to applicants were always published, two Boards of Dental Examiners within a year would have asked, "What is the meaning of Spina Ventosa?" which Dunglison's Medical Dictionary tells us is "a term of no definite meaning, as is obvious from these various words having been considered its synonyms: *Spinæ ventositas, Teredo, Ostarthrocace, Fungus* seu *Tumor fungosus articuli, Lupia juncturæ, Hyperspongia, Flatus spinæ, Arthrocace, Pædarthrocace, Sideratio Ossis, Cancer Ossis, Gangræna Ossis, Exostosis, Osteoid Cancer, White Swelling* (of some). By some it is defined to be a disease of the osseous system, in which the texture of the bone dilates, seeming to be distended with air, and constituting a variety of osteo-sarcoma. By others it is considered to be a tumor arising from an internal caries of a bone; occurring most frequently in the carpus or tarsus. The term itself is a translation from the Arabic of Rhazes. See also Hydrarthrus, Mollities Ossium, and Osteoid."

In conclusion, does this justify the charge that unpractical questions are asked? Here is the examiner's definition, as quoted: "An absorption of the roots of teeth. It takes its name from absorption of the bodies of the vertebræ of spinal column." He then got a tooth with the end of the root wasted away, and he gave us that as a specimen of Spina Ventosa!

EMPYEMA OF MAXILLARY SINUS, COMPLICATED BY EMPYEMA OF CONTIGUOUS SINUSES.

BY H. J. CUSTER, M.D., D.D.S., COLUMBUS, OHIO.

(Read before the Ohio State Dental Society, December, 1899.)

On account of the frequency with which the various lesions of the maxillary sinus are supposed to result from diseased teeth, the dentist is often the first one to examine the case. For this reason it is well that the dentist be able to diagnose and prognose the case, even though he may not choose to treat it.

In a paper presented to this society on a former occasion the writer discussed the treatment of maxillary empyema when complicated by various conditions within the antrum. This paper will therefore be devoted to complications exterior to the antrum, or, still more specifically, to the differential diagnosis of empyema of the frontal, ethmoid, sphenoidal, and maxillary sinuses, with special regard to the latter condition when other sinuses are involved.

Considering a few essentials of more recent anatomy, we find that the maxillary sinus is a cavity of irregular size, shape, and position. It usually stands over at least some portion of the alveolar process, but may be small and entirely external to the alveolar arch; so that the roots of some posterior teeth may enter the nasal fossa.

Some portion of the antral floor is usually below that of the nasal passage, but the entire floor of the antrum may rarely be higher than the nasal floor; so that, as Cryer has demonstrated, an opening through the canine fossa would enter the nasal passage where the antrum is small and situated well above and external to the alveolar arch. This irregularity should also be remembered in transillumination.

The greatest area of thin bone is not in the canine fossa, but forms the internal wall of the antrum; so that in alveolar abscess the contour of the canine fossa is modified, while in confined suppuration of the antrum the internal wall will often bulge before the canine fossa is disturbed.

The natural opening of the antrum is usually as far back as the first molar, and opens between the middle meatus and usually the upper part of the antrum. But its position and size are not constant. There may be several openings, or even none at all.

Between the lower halves of the orbital cavities lie the ethmoid cells, just to the rear of and below which is the sphenoidal sinus. In rare instances the crooked canal draining the frontal sinus opens directly into the maxillary sinus, but it usually opens into the middle meatus a little anterior to and above the ostium maxillare; and in the same region are the openings of the anterior ethmoid cells. The openings of the posterior ethmoid cells and the sphenoidal sinus are in the superior meatus. We have in the maxillary sphenoidal frontal and ethmoidal sinuses or cells a set of cavities the lining membrane of which is practically identical, while the various diseases, along with their causes, are also much the same.

When we further consider that the outlets of these several sinuses occur within one small area, that is subject to great variation, it is not surprising that two or more sinuses may be involved at the same time; or that when only one cavity is involved, we may at times be perplexed to locate, so far as the cause of empyema of any of the sinuses is a factor of the diagnosis, acute and chronic rhinitis, eruption fevers, surgical and accidental traumatism, insects, foreign bodies, and erysipelas, either of which may cause empyema in any of the sinuses without much choice of selection, with the exception that the sphenoidal sinus is less exposed to traumatism of erysipelas, and that the maxillary sinus has the additional exposure of hydrargyrism and dental lesions.

Acute empyema of the maxillary sinus is characterized by a variable amount of pus coming from the middle meatus, and sometimes escaping into the pharynx while sleeping, and at other times usually through the nostril. The discharge is usually light yellow, and the odor may be slight or pronounced. It may be rather continuous or more or less periodical, depending upon temporary occlusion of the ostium and certain positions of the head. Dull, heavy, deep-seated pain within the cheek is common, and there may be frontal or supraorbital pain or a general headache. Not infrequently there are fever, sweats, and malaise. The cheek is often feverish, tender, and fuller than usual. The conjunctiva is likely to be injected, and the lids swollen. The mucous membrane is deeper in color, and the region is tender on percussion. Percussion of the teeth below the antrum usually reveals at least slight periodontitis, and pressure upon the hard palate often finds a tender spot. The mucous membrane of the external nasal wall will be congested and tender, especially above the ostium.

In chronic empyema there is less discharge than in the acute form, and in consistence it is probably less thick, the color and odor being about the same. The pain varies from none at all to a dull, heavy, uneasy sensation deep within the cheek, and there may be moderate frontal or supraorbital pain, or a general headache. Bryant mentions two cases in which the only symptom was supraorbital neuralgia, one case being cured and the other temporarily relieved by opening the antrum. Le Fevre reports one case in which the only symptom was occipital pain from the antrum.

When the wall of the canine fossa is thin, there is likely to be tenderness on percussion. The mucous membrane of the region will often manifest a deeper color than the healthful side. Sometimes the teeth below the antrum are perfectly comfortable on percussion or hard pressure, and the hard palate may be just as irresponsive, even though the antrum lies above. The mucous membrane of the nasal wall is often thick and congested.

When pus of either acute or chronic empyema fails to make its escape, the symptoms of the acute form become pronounced. There is intense boring, tearing pain in the jaw, often attended by severe pain in almost any part of the head, or even neck. The cheek is flushed, hot, tender, and swollen, and there may be exophthalmos along with visual disturbances.

There may be bulging, with crepitation, of the canine fossa, but the nasal wall is more likely to bulge first; and it is always very tender. Almost always there is periodontitis, with a tender and perhaps bulging hard palate and inability to open the mouth.

Fistulæ may open either through the cheek, along the side of a tooth, above the alveolar arch, through the hard palate, into the nasal or orbital cavity, or into the pterygoid or spheno-maxillary fossa. The writer has seen fistula established in all those positions excepting the last two. There are fever, rigors, and sweats, and the prostration is sometimes alarming to friends of the patient.

In acute empyema of the frontal sinus there is often a blush over the region, which is the seat of intense, pressing pain; and the pain may radiate especially along the supraorbital nerve. Pressure upon the frontal eminence in the upper inner angle of the orbit, and often along the supraorbital nerve, will cause much pain. There is photophobia, conjunctival injection, periocular edema, and perhaps some exophthalmos. The pain is increased by inclining the head downward, and by coughing and sneezing.

The discharge is usually a light yellow, much purulent, and without much odor; and first appears rather high and well forward in the middle meatus. The discharge is likely to be more or less periodical, recurring one or more times daily, and frequently just after sneezing, when the pain quickly remits. According to Myles, there is dullness on percussion. I have percussed many times, but have never been able to detect more than ordinary dullness.

In chronic frontal empyema the symptoms are much the same as in the acute form, only less pronounced. There is not likely to be discoloration over the sinus, except perhaps during cold or damp weather, when an evacuation is liable to occur. The patient becomes apathetic, depressed, forgetful, and incapacitated for business. When the pus is confined the acute symptoms are pronounced, and there is bulging in the frontal corner of the orbit, and perhaps a fistula opening externally or into the orbital or cranial cavity.

Acute empyema of the ethmoid cells is so often accompanied by influenza or some form of rhinitis that it is seldom recognized as a separate condition. When present there is painful tension between the eyes, and this is increased when the head is lowered and by coughing and sneezing. There is febrile disturbance, and a rather regular copious discharge of inodorous pale yellow muco-purulent fluid from the superior meatus when the posterior cells are involved.

In chronic empyema there is often discoloration around the inner canthus, and there is a disagreeable, uneasy sensation between the eyes. The discharge alters in quality and quantity from time to time, and occasionally contains shreds of soft tissue or particles of bone. When of some duration a probe in the ethmoid region will often detect denuded crumbling bone.

When the suppuration is confined there is often a bulging at the inner canthus, along with other ocular disturbance, and symptoms of confined pus much the same as those of other sinuses. A fistula may open externally or into the orbital or cranial cavity.

Empyema of the sphenoidal sinus, on account of its location, is difficult to recognize. Recent investigation, however, shows the condition to exist more often than was formerly supposed. In the acute form the symptoms are much obscured by attracting inflammations. But there is liable to be a sense of weight and pressure deep in the middle part of the head, a vague sense of occipital distress, and dull headache. There may be temporal or deep-seated orbital pain, increased by sudden movement of the head, and pain in a part or all of the trigeminal nerve. Sometimes there is tinnitus aurium and vertigo. There is more or less muco-purulent discharge, varying in odor and consistence, and escaping far back in the superior meatus. This discharge usually passes into the pharynx, instead of through the nostril.

When the condition is chronic the symptoms are much the same as in the acute form, only milder; but the discharge may contain particles of crumbling bone. Kyle is certainly correct in picturing the mental condition as one of hebetude and depression, with heavy eyes, sleep disturbed, stomach disordered, breath sour, and the general appearance that of the suppurative cachexia.

Where pus is confined there is the most intense pain, and likely to be marked ocular and visual disturbances. Irregular fever and sweats develop; prostration is profound; mental symptoms are marked, and cerebral complications may follow.

My own surgical experience with sphenoidal empyema has been limited to one case, which is important by showing the mental phenomena liable to occur when pus lies within close proximity to the brain, the mental condition always being more marked in empyema of upper sinuses than in empyema of the maxillary sinus.

The patient, a married lady, forty-six years of age, residing near this city, had for fifteen years complained of nasal trouble, and for the past four years there was every three or four months a sudden free discharge of moderately fetid pale greenish muco-purulent fluid into the nose and pharynx. This discharge was always preceded by three or four weeks of intense boring pain deeply situated in the median line. In the words of the patient, there was at times a "sensation of something moving within the head." "The head nearly always feels feverish and painful." There was disturbed sleep, impaired memory, heavy eyes, depression, and hebetude, and some tendency to self-destruction, which was especially marked on lying down.

Slight conjunctival congestion was the only ocular disturbance that could be attributed to the empyema, though the entire right side of the face was fuller than the opposite; this condition seeming to be from atrophy of the left side, rather than disturbance of the right. The general appearance was that of some grave disorder.

Prior to October 1, 1899, I had by two operations removed a number of polypi, a middle turbinated bone, and a part of the septum. On the above date I opened and curetted the sphenoidal sinus, removing a small amount of thin fetid fluid and some spongy membrane. Syringing and tonic treatment was adopted, and general improvement soon followed. Ten months have now passed, and the patient has been comparatively free from pain, excepting three months ago, when the former trouble threatened to repeat itself; but the pain, which did not equal the original, subsided without a discharge occurring.

The patient has increased in weight, and is much improved both mentally and physically.

For the present purpose it is not necessary to differentiate between ethmoidal sinuses, but we do wish to differentiate between empyema of any or all of these sinuses and that of the maxillary sinus.

From the foregoing symptoms it is evident that there will not be much difficulty in locating a confined suppuration, unless it be that of the sphenoidal sinus. The recognition of the acute form will be more difficult, while the chronic condition will at times tax the most competent. To this condition special attention will be given.

Even though, from symptoms already stated, we are able to diagnose maxillary empyema, should there be a discharge into the pharynx or through the nostril we should always make a careful examination of the nasal passages. The same cause may induce empyema simultaneously in two or more cavities; or the empyema may extend by continuity of tissue, or by infection, from above downward or from below upward. Any person who is accustomed to looking into mirrors and small cavities, as is the dentist, will not have much difficulty in passing a small mirror into the pharynx and having a good look at the posterior nares, and inspection of the anterior nares will be even less difficult.

When pus is seen in the middle meatus, it may be from the frontal sinus, from the anterior or middle ethmoid cells, or from the maxillary sinus, even though the head is upright. Wipe away the pus and wait for more. If it appears well forward, under the middle turbinated bone, it is probably from the infundibulum, especially if a probe can be inserted into a canal.

Discharge from the ethmoid cells seems to come from all around above the antral opening, and usually has less odor than discharge from the antrum. Pus from the antrum usually has an odor that is perceived by the patient and his friends. Pus from the ethmoid cells often is without odor, but even if there was odor the patient would likely be unconscious of it.

In chronic empyema of the ethmoid cells there are often particles of soft tissue and bone in the discharge, and a probe in the ethmoid region will often detect denuded crumbling bone. For this manipulation the keen tactile sense of the dentist probably has no superior.

A blunt probe of proper curvature may sometimes be inserted through the ostium maxillare for about an inch. This will serve to locate the opening while studying the flow of pus. To facilitate matters a four per cent. spray of cocain, followed by a three per cent. spray of suprarenal capsule extract, will so anesthetize and contract the tissues that inspection and manipulation will be easier, and pus may now appear, whereas it would not otherwise.

Before using these solutions I always study the case well in its original condition. Pus coming from the posterior ethmoid cells or sphenoidal sinus does not often run into the region of the antral opening, unless there be polypi or deformities directing it out of its usual course. It is best seen by posterior retinoscopy, and appears in the space between the posterior end of the middle turbinated bone and the septum.

After placing the head in such position as to make the ostium the dependent part of the antrum, it is well to wipe away the pus and wait for its reappearance. If pus is in the antrum it nearly always escapes, while pus from the upper sinuses will not appear. Should the pus not now escape from the ostium it is well to irrigate with sterilized water, for the pus may be too caseous to escape even though the ostium be open. In some cases I have used peroxid of hydrogen for diagnostic purposes, but only well diluted and with a free opening to avoid pressure.

Transillumination is a valuable aid in diagnosing empyema, especially that of the maxillary sinus; and I have had good results in some cases of frontal empyema. To transilluminate successfully the room should not only be darkened, but should be absolutely dark. A four-candle lamp will then give ample light.

When the walls of a healthy antrum are of average position and thickness, the antral region has a dull glow and a subjective sensation of light within the eye. When there is pus within the antrum the entire region is darker, and the semilunar area is specially obscure. The pupillary glow is reduced or absent, as is the subjective sensation of light. My own experience agrees with that of other observers, in that the subjective sensation of light is well worth considering.

I am not aware of any other person having called attention to the importance of the position of both the head and the light within the mouth while transilluminating. I always use both head and light in various positions, and have noted two cases in which by placing the light well back within the mouth and tilting the head well forward there was a bright semilunar area, pupillary glow, and subjective sensation of light, and yet I took pus from the antrum after examination.

Confined suppuration in any of the sinuses requires surgical treatment. Acute empyema of the upper sinuses may recover by medicinal treatment, or even spontaneously; but acute empyema of the maxillary sinus requires irrigation through an artificial opening, or at least through the natural opening. Chronic empyema of the antrum is best drained through the mouth, and when uncomplicated usually responds well to such treatment. But if there be also chronic empyema of the ethmoid cells or of the frontal sinus, the maxillary drainage will only palliate the case, and not cure.

In conclusion, the history of the case, the symptoms, a careful study of the nasal passages, perhaps the use of hydrogen dioxid, and transillumination will usually decide whether the maxillary empyema is void of external complications; in which instance the disease will often yield promptly to treatment by the dentist, whose system of drainage is probably superior to that of any other practitioner.

THE X RAY FOR DIAGNOSING IN ORTHODONTIA.

BY DR. J. N. M'DOWELL, CHICAGO, ILL.

THE discovery of the X ray has become of universal importance, and it is being applied and used in almost every branch of science. Its use in dentistry for discovering or revealing teeth that have failed to erupt, malformed roots, correct diagnosis of supernumerary teeth, dental tumors, or cystic formations, has proven to be very valuable. In that branch of dentistry known as orthodontia every change of the occlusion of the teeth and every change in the facial appearance, as the result of delayed eruption, early extraction, abnormal or supernumerary teeth, is of vital importance in the treatment of cases. The influence of a missing tooth or of a delayed or supernumerary tooth on the occlusion is twofold:

First. It alters more or less the position of all the teeth, causing a change of the occlusion.

Second. If this condition is allowed to remain very long it becomes permanent, and cannot be restored to normal again.

Delayed or missing teeth usually work the most baneful results upon the occlusion, impairing their functional service and destroying the harmony of the relation of one arch to the other. When a tooth fails to erupt, and after examination there seems to be no indication of one, the usual instruction is to wait two or three years, thus establishing a permanent abnormal condition by the delay.

Sometimes it is difficult to determine a temporary lateral from a permanent one. Sometimes a third well-developed tooth is erupted. And again, sometimes one, two, or three permanent teeth fail to erupt at the proper time, and the question arises whether they have failed to develop entirely or are simply delayed in erupting. Just what course is best to pursue at such times is not always clear or satisfactory. By the use of the X ray the course to follow is made clear to-day; also by its use the method of lancing the tissue and packing the cotton, probing into the process, and other uncertain methods have been more or less eliminated. If the conditions are known, the advantages of early interference and treatment for missing teeth (if in the upper arch) would be valuable, owing to the fact that the proper course of treatment could be carried out in the lower arch at the proper time, preventing an inharmonious relation of the arches existing. If it were a delayed tooth, and it had been located with the X ray, space could be made for it to come into position; or if it had been prolonged by a temporary tooth or its course changed by a supernumerary, the cause could be removed. If there is sufficient space and no interference by unnatural causes, permanent teeth will always erupt at the proper time. If, however, there is not sufficient space or there is interference of any kind, they usually erupt remote from the normal position, or become imbedded in the process and are enveloped entirely by bone.

Supernumerary teeth should be removed at first appearance. If not certain of their identity,—for some are hard to distinguish,—the use of the X ray usually supplies the necessary information.

Malformed permanent teeth, fortunately, are very rare. If by diagnosis they are found to be malformed permanent teeth it is best to submit to the inevitable, unless they are monstrosities, when they should be extracted.

All of these four conditions just mentioned vary more or less the conditions of treatment, according to the teeth, position, number, and effects upon the occlusion.

While no two cases are alike as regards lack of development or malformation, their possibilities are all classified or outlined under four forms; and to facilitate the procedure of taking X-ray views for this class of work in orthodontia I have placed them in the order of their importance as effecting changes in the occlusion as follows: *Missing teeth, delayed eruption, supernumerary teeth, and abnormally developed permanent teeth.*

In taking X rays of the arm, head, or different parts of the body, the photographic sensitive plate being incased in one or more covers of black paper impervious to light, is placed under or opposite the part which it is desired to photograph, and the tube known as Crookes's tube is held above or opposite that part. In taking X rays of the teeth it was found impossible to conveniently cut glass sensitive plates to correctly fit the different parts of the mouth without the spoiling of many plates. To overcome this difficulty it was necessary to have something that could be easily cut and shaped to fit the mouth for each occasion, and at the same time transmit light as a negative in making photographs. Celluloid prepared with sensitive chemicals has been found to answer this purpose best.

No special preparation of the mouth in the way of washes, etc., is necessary, as the plate is protected by a covering. Cut a piece of cardboard to fit the part of the mouth that is to be photographed. In the dark room lay the cardboard on the sensitive celluloid plate and cut to the same shape. Figs. 2, 4, 6, etc., of the X-ray pictures show the original shape of the cut celluloid.* This is then wrapped in black paper to protect the plate from light and the moisture of the mouth. The head is so placed as to be immovable, and the sensitive celluloid placed in the mouth directly back of the teeth to be taken. The usual time of exposure is about a minute with Crookes's six-inch tube. This tube should be stationed some six or eight inches above and in front of the teeth to be taken, in order to secure the outlines of the roots. If the tube is held directly opposite the teeth the roots are not taken, as the plate cannot be inserted high enough, owing to the shape of the roof of the mouth.

Reconsidering the outline as given above, we have first,—

Missing Teeth.—The effect of a missing tooth upon the occlusion is the most aggravated condition met with, and at the same time the most uncertain that we have to consider. In the treatment of malocclusion it is of vital importance that we have all the teeth in the arches, for in the young the position of the teeth is easily changed; and so we can more easily and with far less pain aid nature in the development of the arches to accommodate all the teeth in normal position. The loss of a tooth from the lack of development can never be compensated by the use of an artificial tooth that will fill all the conditions necessary in the young, owing to the fact that changes by development are continually going on up to maturity. Thus the importance of knowing whether a tooth has simply failed to erupt from lack of space, coming down malpositioned some time later in life, or whether it has failed entirely to develop, either condition modifying the treatment.

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*Figs. 2, 4, 6, have been shortened from one-third to one-half in their vertical extent in making the half-tone reproduction.—Ed. DENTAL COSMOS.

"A" of Fig. 1 shows the model and occlusion of the anterior teeth of a young lady aged twelve. Both the upper laterals are missing, causing a decided contraction of the upper arch and causing the lower, on account of the inharmony in the relation of the arches, to contract from the action of the muscles of the mouth and face and force of the occlusion contact from mastication, in an effort to conform with the upper. All the teeth were late in erupting, giving some hope that the laterals were delayed. In the treatment the teeth were aligned to normal, space being made for the laterals. (See "B.") After holding the space for one year with artificial teeth an X ray was taken, which revealed the fact that no teeth were in the process, and the laterals had failed entirely to develop (Fig. 2).

A FIG. 1. B

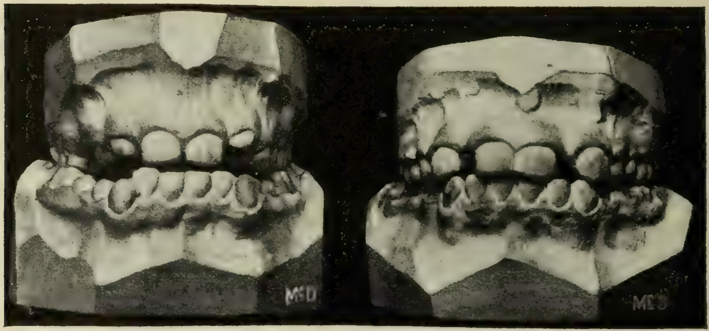


FIG. 2.

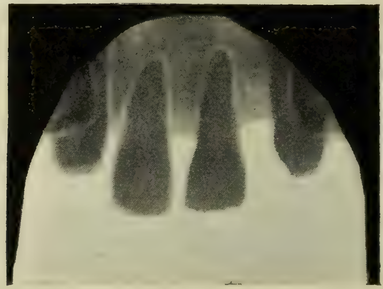


Fig. 3 shows the models of a young man aged twenty-three. The left temporary cuspid occupied the position of the left permanent lateral. This gentleman desired the tooth removed. An X ray was taken (Fig. 4) for a possible delayed lateral, which shows no signs of the permanent lateral.

Fig. 5 shows the models of a young lady aged twenty-two, with lower temporary centrals in position. The X ray discloses the fact that no permanent centrals have ever developed (Fig. 6).

FIG. 3.

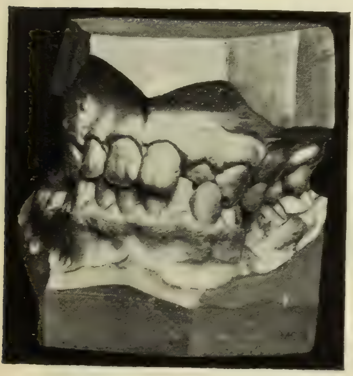


FIG. 4.

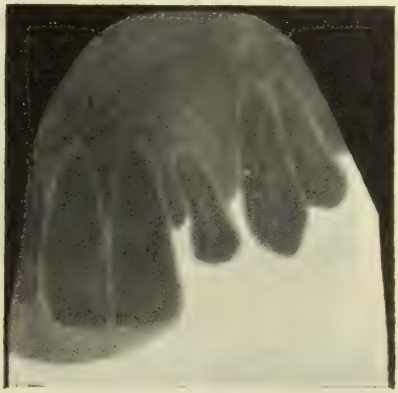


FIG. 5.

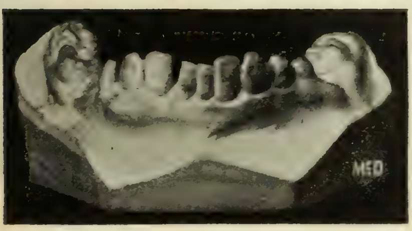
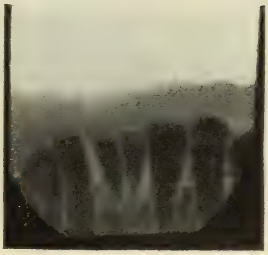


FIG. 6.



Delayed Eruption.—The effect of delayed teeth on the occlusion is almost as bad as where the teeth have failed entirely to develop. However, such teeth can now be located with the use of the X ray before they are permanently lodged in the process; and if it is known that they are developing or are lodged in the process from a cause, it will then be possible to prevent a permanent abnormal condition from being established by removing the cause, and with regulating appliances space can be made for the teeth to come down into normal position.

"A" of Fig. 7 shows the models of a boy eight years old. The space for the laterals is entirely closed up. The teeth in both the upper and lower arches were regulated, making the necessary room for the laterals in the upper arch. (See "B," Fig. 7.) This space was retained for two years, and at the end of that time there was still no sign of the laterals. Examination gave no indication of delayed teeth, but the result of the X ray, Fig. 8, shows the laterals high up in the process, still only partly developed. It was several months later before there were any indications of the laterals making their appearance. Fig. 9 shows the same eight months after the X ray was taken.

A Fig. 7. B

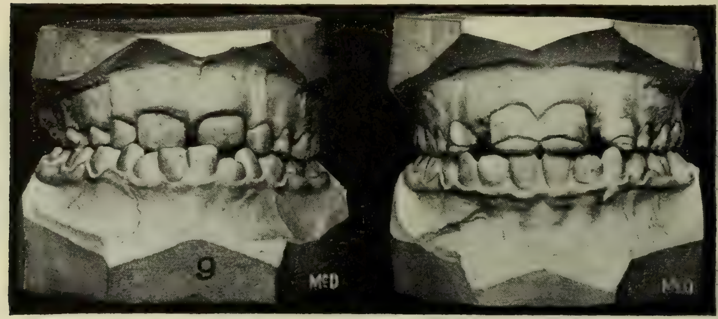


Fig. 8.

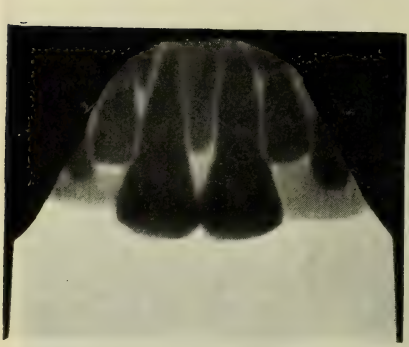


Fig. 9.

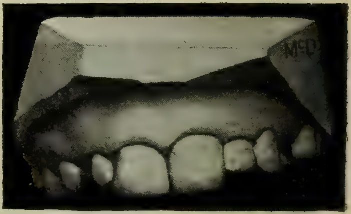


Fig. 10 shows the model of a young lady, aged twenty-four, where the right upper central is missing. The diagnosis is misleading. Seemingly the tooth has been extracted, owing to the depression and absorption of the process at that place, causing a marked deformity in the occlusion by the contraction of the upper arch as a result of the loss of the central. The X ray, Fig. 11, shows the tooth in position high up in the process and rotated half-way. A prominence caused by the tooth can be felt high up at the conjunction of the frenum labii and the muscles of the lip. The position is an unusual one.

"A" of Fig. 12 shows the models of a young girl, aged eleven. All the bicuspids have erupted with the exception of the lower left second bicuspid, which was supposed to have been extracted. The space for this tooth is closed up, the lower second bicuspid tipping backward and being followed by cuspid and lateral. There was inharmony of the arches from the apparent loss of this tooth, the upper arch having contracted to accommodate itself to the lower, consequently closing up the space for the upper cuspid. It was the original intention in regulating this case to make space for a bicuspid, moving the lower teeth forward on that side, trueing up the occlusion and placing in an artificial bicuspid, thus restoring normal

FIG. 10.

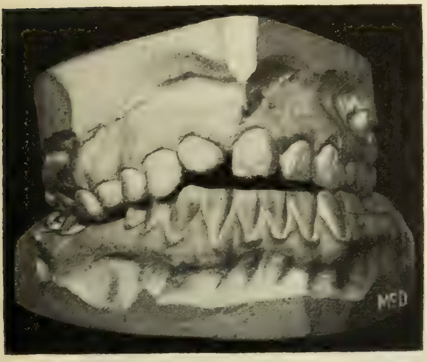
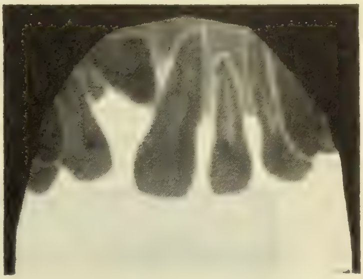


FIG. 11.



A FIG. 12. B

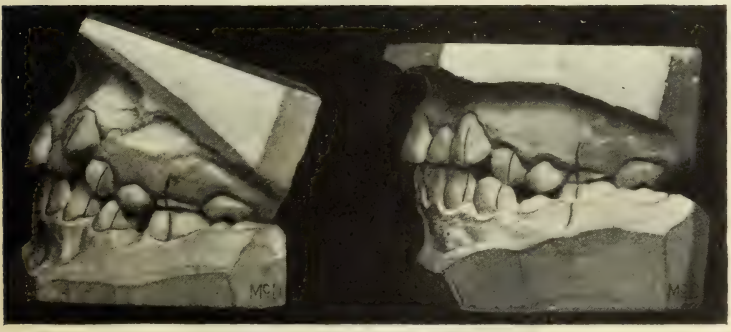
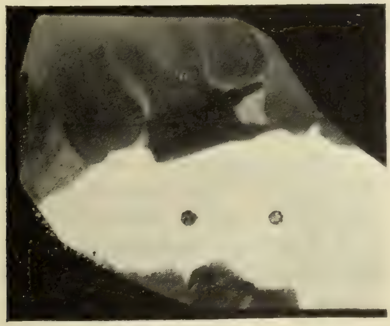


FIG. 13.



occlusion and harmony in the size of the arches. However, after some space was gained there seemed to be indication of a tooth in the process. An X ray was taken of the case with the regulating appliance still in position, which revealed the second bicuspid far down in the process (Fig. 13). Four months later this tooth made its appearance. "B," Fig. 12, shows the change in the occlusion of this case before regulation, and after the arches had been enlarged to accommodate the delayed bicuspid.

Supernumerary teeth are usually most aggravating in their results in changing the normal position of the teeth, owing to the unusual position, time, and different forms in which they present themselves.

A FIG. 14. B

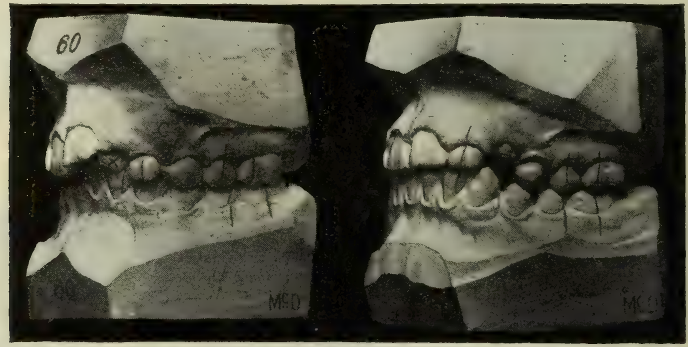
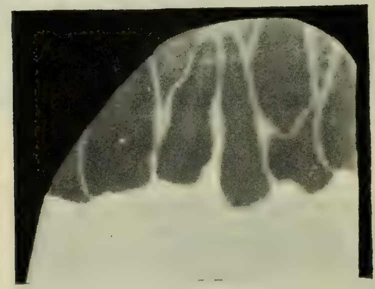


FIG. 15.



"A" of Fig. 14 shows the model of a boy thirteen years old, showing two seemingly perfectly developed laterals, with but little evidence of a permanent cuspid. The laterals are identically alike in size, shape, and form. As it was necessary to extract one tooth, making room for the cuspid, the question naturally arose, which one? The preference, of course, naturally would be to leave the lateral next to the central, and extract the one occupying the space where the cuspid should be. The position of the cuspid is marked "C." Fig. 15 shows an X ray taken of the same case, showing clearly and conclusively the course of treatment; the lateral tooth next to the central, marked with a small *x*, being undeveloped and deformed, was extracted, while the lateral occupying the space for the cuspid was left, as it was perfect in anatomical construction. The X ray also shows the cuspid buried in the process, ready to come down when space will permit, thus restoring all to a normal condition. The guiding marks on the lateral, bicuspid, and molar of Fig. 14 show the condition of the occlusion at the beginning of the case. There is little or no room for the cuspid to come down. The upper left central is protruding one-fourth inch beyond the other. "B," Fig. 14, shows the condition of the occlusion after the case has been completed. The teeth are in normal contact, and the guiding marks on the lateral, bicuspid, and molar now approximate. The lateral next to the central was extracted, and the lateral occupying the space of the cuspid was moved forward to normal position and the prominence of the upper left central was reduced to normal.

FIG. 16.

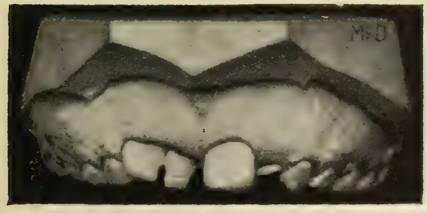
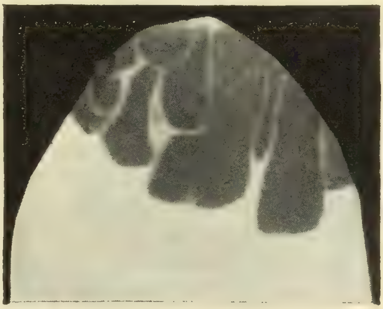


FIG. 17.



Abnormal Development.—Fig. 16 shows the abnormal development of the upper central incisor, the tooth being so much larger than the other central, and the malformation so marked, that the parents sought for an early interference. An X ray, Fig. 17, was taken of this case, which shows that it is the permanent central than the other central, and the malformation so marked, that the permanent right lateral is still developing deep down in the process, and still farther down is the permanent cuspid just developing. The abnormal right central is fairly well formed below in the process, with a slight bifurcation of the root at the apex.

Many other cases similar to these could be given. However, what has been shown seems to illustrate the vital importance of a correct diagnosis and the advantage of early interference in the conditions so often met with in the treatment of malocclusion of the teeth, and this classified outline, in connection with the use of the X ray, will perhaps serve as a medium to correct many mistakes where treatment of cases of orthodontia is delayed until they become permanent abnormal conditions.

ORAL CONDITIONS IN RELATION TO GASTRIC DISEASES.

BY FANNIE E. HOOPES, M.D., D.D.S., BALTIMORE, MD.

(Read before the Maryland State Dental Association, January 24, 1900.)

It has been claimed, and not altogether unjustly, that specialists can see only their own particular line of work, and just as formerly all roads led to Rome, so in their view all symptoms point to some particular organ or organs, their hobby. From this charge the dentist is usually free,—too free, for, unfortunately, he or she frequently overlooks the relation of parts, especially the mouth in its connection with other organs. But as the gateway of the alimentary tract it is certainly entitled to more consideration than is usually bestowed upon it, and its healthy or unhealthy condition would naturally suggest some effect upon subsequent processes of digestion, "for the human and animal mouth is an aperture for the reception of food for the body, in which, by its peculiar apparatus of nerves, muscles, bones, taste, suction, mastication, deglutition, it is prepared and further introduced into the alimentary tract." The function of the teeth in assisting the incorporation of the food with saliva, by the action of which the starch is converted into dextrose, is too familiar to all for me to dwell upon. If, however, on account of lost or carious teeth, the food is not properly masticated, the saliva cannot act so promptly; for, although the transformation of starch into sugar by ptyalin occurs very rapidly, yet the ferment could not act so thoroughly on the more or less compact masses, notwithstanding that the saliva swallowed continues its action in the stomach, as has been shown by Von der Welden.

Ewald states that he has never found saliva which failed to convert starch into sugar. Mercury, gold, copper, jaborandi, muscarin, etc., all excite salivary secretion, while the normal amount varies from two to three pints in twenty-four hours. It is greatly increased in acute fevers and in mental and nervous affections, constituting the condition so well known as ptyalism, in which the ferment ptyalin is decreased; salivation, however, may be present without inflammation of the mouth. In the course of infective fevers, typhus, typhoid, pneumonia, pyemia, etc., inflammation of the salivary glands appears, the result either of septic infection through the blood or inflammation through a salivary duct, or in connection with injuries to the abdomen or pelvis, to which connection Stephen Paget has called attention; twenty per cent. of these cases were due to injury or disease of the alimentary tract. It may also occur in connection with gastric ulcer.

L. Héritier found the saliva to be acid in five cases of cancer of stomach, Frerichs in six; while others dispute their conclusions, and Boas claims that the ferment is not much affected by outside influence such as stomatitis, periodontitis, and alveolitis.

In a case reported by Richet, of a man with stricture of esophagus, not the smallest trace of saliva could reach the stomach. After asking the patient to chew potassium ferrocyanide not a trace of the salt could be detected in his stomach, yet whenever he chewed sugar, slices of lemon, etc., there was copious secretion in the stomach. This interesting case proved that the stomach secretion may be reflexly stimulated from nerve-centers outside of that viscus, just as the nerves of taste and the olfactories may produce this reflex directly,—*e.g.*, without the intervention of any psychical process. It is different when the reflex proceeds from the optic nerve; thus the mere sight of meat causes copious secretion of gastric juice in hungry dogs, just as saliva runs freely from their mouths if they look a long time at a lump of sugar.

Fear has a most potent influence upon the salivary flow, and it dominates the entire tract; it causes the food "to stick in the throat" on account of stoppage of the flow of saliva and refusal to act on the part of the muscles of deglutition; in such cases food remained undigested for hours, and was finally vomited; we shall not err in assuming this to be due to the absence of gastric juice, corresponding to similar lack of saliva.

In gastralgia the attacks of pain are ushered in by a feeling of discomfort, etc., and not infrequently the condition may be introduced with a copious secretion of saliva. Oser mentions a case in which attacks of gastralgia began almost uniformly with a severe toothache. There are sometimes found at intervals on the coat of the stomach (especially after irritation of the mucosa by food) eruptions like red pimples rising above the surface; these are at first sharp, pointed, and red, but frequently become filled with white purulent matter; at other times there are circumscribed red patches varying in size and extent half an inch to one and a half inches. These appear to be the effect of congestion in minute blood-vessels of the stomach; there are also seen small aphthous crusts in connection with these red patches.

Ewald, in his latest book on diseases of the stomach, frequently refers to conditions of the tongue, and asks, "Is the condition of the tongue really the mirror of the stomach, or has it, as was held for a long time, nothing whatever to do with it?" Or is its condition to be regarded simply as an index of the existing state of the oral mucous membrane? Henoch confirms the latter view,—that fur on the tongue in disease (this does not include coating found at the base of the tongue of many persons, especially in the morning, and of those who smoke incessantly, which consists of desquamated epithelium, remnants of food, and bacteria) denotes only a catarrh of the mucous membrane of the mouth, caused either by direct local irritation (smoking, bad teeth, drugs, periostitis, angina, etc.) or spreading from other mucous membranes,—*e.g.*, the stomach and intestines. This is undoubtedly true, and we must remember the various factors which produce coated tongues, in order to distinguish between remote and local causes; but the uniform relation of the state of the tongue to that of the stomach in all cases indicates that the connection existing must be much deeper than would be inferred from independent catarrh which, having received its first impulse from the stomach, persisted after removal of the gastric trouble. An uninterrupted reflex action, the direct track of which we can easily trace, must exist here, and the old physicians seem to have been right in laying stress on the tongue's appearance as indicative of the condition of the stomach.

The condition of the tongue may be variable, and yet give information of dyspeptic manifestations. Thus in ulcer it is almost the rule to find the tongue red, moist, smooth, with thin white fur at its base. In nervous dyspepsias and neurasthenic conditions the tongue is strikingly pale, smooth, moist, and has a bluish, rather than a reddish, tinge. At times are also deep transverse fissures or depressions at the side, which look like excoriations, but are smoothly covered by a mucous membrane; the latter are very annoying; again, the organ may seem to be covered with a white fur, whereas this appearance is really only due to the anemic condition of the filiform papillæ. In other patients the tongue feels swollen or enlarged, causing them to make incessant attempts at swallowing, as if they wished to get rid of some foreign body in the mouth; such a feeling is also exceedingly annoying. Among symptoms of gastritis (headache, tension of epigastrium, flashes before the eyes, etc.) we find the tongue at the beginning only completely covered with a thick, tenacious white fur, which may be colored by foods or drugs and which retains impressions of the teeth; as disease advances it tends to clear up at the edges; at times herpes labialis develops.

Owing to the structure of the gastric membranes, every inflammatory process necessarily attacks the gastric glands; Beaumont's investigation on St. Martin showed that every catarrh was accompanied by disturbance of the secretion of gastric juice, affecting the glands themselves, which principle applies to all mucous membrane.

Every acute gastritis may be said to be toxic, unless it shows symptoms of irritation and inflammation. Many persons have predisposition to gastric catarrh, as others to catarrh of the nose, throat, and to other diseases; such people are made ill both by the quality and quantity of certain articles of food which have no such effect on a healthy stomach. Smirvnow in six cases of gastritis membranacea diphtheritica found a large number of micrococci and bacilli in the membranes lying upon the gastric mucosa; yet he could not detect them in the lumen of the glands or tissues. But, as the normal products of decomposition, which irritate the mucous membrane of the stomach, are always due to organized ferments, Ewald believes that acute gastritis can in this sense be positively referred to micro-organisms. It depends upon the number introduced into the stomach and upon the question whether the antifermentative gastric juice at the individual's disposal is able to limit or stop decomposition.

Psychical and nervous disturbances exert a marked influence upon the development of acute gastric catarrh. Boas has found acid reaction to be so variable in hysterical women he could attach little or no importance to the test.

Among the products of fermentation, the first to attract attention is lactic acid. In fact, lactic acid may be said to be always present at some stage, usually the earlier stages, of gastric digestion whenever carbohydrates have been ingested, but the amount normally found is small, though it is present in the beginning of digestion in the case of bread. It must be remembered that lactic acid may be formed from carbohydrates, and it may be due to defective teeth or a catarrhal condition of the mucous membrane of the mouth; unless, therefore, these are excluded, it is not admissible to refer the origin of the acid to stomachic disease. When in doubt instruct the patient to chew stale bread, and expectorate in a suitable vessel; a little water is added, and the whole is kept at 38° to 40° C. (102° to 104° F.) for half an hour; with a normal condition of the mouth, lactic acid is not shown at the expiration of that time.

Boas regards the occurrence of large amounts of lactic acid as suggestive of malignant disease, but Dr. Simon has recently observed the presence of large amounts of lactic acid associated with hysterical anachlorhydria (absence of free HCl) in young girls. This condition was formerly regarded as pathognomonic of carcinoma of the stomach, although carcinoma may exist with HCl demonstrable to the last.

While formerly supposed to be secreted by the stomach, the more accurate investigations of later years have shown beyond doubt that lactic acid in the gastric contents is either introduced as such in foods or arises from abnormal fermentative changes in food after ingestion. It may be introduced either as sarcolactic acid from meat or as fermentation lactic acid as found in bread or other starchy foods. The easiest clinical test for lactic acid is ten cc. (two drops four per cent. solution) carbolic acid mixed with twenty cc. water; a drop of strong solution ferric chlorid being added, a beautiful blue amethyst color is produced, which turns canary yellow when lactic acid is added. (Uffelmann's test.)

An increased amount of lactic acid may be referable to oral and gastric disease at the same time. In an address before the Maryland State and Washington City Dental Associations Dr. Wm. Welch, the distinguished pathologist of the Johns Hopkins University, referred to the large number of bacteria, many disease-producing, existing in the mouth even of the most cleanly; that the saliva in fifteen to twenty per cent. of human beings is virulent in nature, and especially so under strong emotions, as anger, fright, etc., thus giving color to the old idea that the bite of some people is poisonous. That mice inoculated with human saliva have died is doubtless known to you all, and it would consume an entire evening were I to attempt to enlarge upon this subject, so I merely make a brief notice, only adding that the use of certain filling-materials in the mouth seems to destroy the toxic quality of the saliva. Dr. Welch stated that silver gave a very remarkable effect, as also tin and amalgam,—in the latter case, of course, due to the presence of mercury; gold had least power of any in the experiments referred to. Tubercle bacilli are present in nine out of twenty mouths. (Strauss's research.)

The invasion of the mucous membrane of the stomach by fungi may be fittingly discussed in connection with gastritis mycotica or parasitaria. One case is reported by Kundrat of a drunkard with favus universalis which had penetrated as far as the stomach and intestine. Bacillus anthrax causes the trouble to reach the stomach either by means of spores from without or through the blood. Gerhart reports an acute gastritis caused by larvæ eaten with raspberries.

Chronic gastritis may result from direct local irritation, whether in consequence of cicatrices and neoplasms in the mucous membranes or by irritating substances brought in contact with the gastric coat. Direct local irritation is often caused by swallowing large, half-digested, and insufficiently masticated morsels of food, which irritate the gastric mucosa by predisposing to fermentation of stomach contents. A case of chronic gastritis has rarely been observed in which there was not present one or more of the following complications: Pharyngitis, posterior nasal catarrh, laryngitis, or a form of stomatitis, the last occurring most frequently. This condition perverts the taste, rendering it pasty, sometimes distinctly unpleasantly acid, bitter, or metallic; breath offensive, caused by caries of teeth and decomposition on and in the lingual epithelium, eliciting the remark that "food has no taste."

Another source from without may be putrefaction in the mouth from carious teeth or inflammation of the gums; the putrid products are swallowed, and cause inflammation directly or indirectly. To this category also belongs tobacco-juice, which frequently causes first subacute, then chronic, inflammation; also alcoholic beverages and condiments in food. Finally, true toxic substances or parasites like trichinæ, worms, larvæ, etc. The patients usually complaining of a dry, salty, or pasty taste in the mouth, which is communicated to food; the tongue is usually coated entirely or at the base, where reddened and swollen papillæ project like strawberries, while the edges bear impressions of the teeth; the thick fur which usually accompanies carcinoma of the stomach is usually absent.

Free HCl is known to exert anti-fermentative effects, and increased intestinal putrefaction will follow its diminution or absence.

The regulation of the diet of the dyspeptic (according to Ewald) begins in the mouth. In a study of the etiology of chronic gastritis two important therapeutic factors are emphasized: care of the teeth, and slow eating,—that is, a sufficient disintegration and insalivation of food. The importance of eating slowly has been told thousands of times; a striking example of its utility is the fact that many people with weak stomachs while on a journey can digest the poor food of hotels, for the reason that, having nothing else to do, they stay longer at the table, yet they suffer from carefully selected and well-prepared dishes at home because the latter are rapidly consumed while the mind is occupied with business cares. Although care of the mouth is observed more than formerly, still we find disgusting examples of neglect.

Teeth poorly cleaned, diseased alveoli, tartar, inflamed gums with thick, whitish green coating of desquamated epithelium, fungi, cocci, and remnants of food between the teeth are easily noticed; not so readily apparent is the filth which covers artificial teeth, broken stumps, etc. Ewald was consulted for a typical mucous catarrh; the patient had an upper plate, and admitted that it was cleaned only once or twice a week. It was covered with a dirty whitish coating of fungi and masses of cocci, while the hard palate was markedly reddened and dotted with small aphthous ulcers. In the stomach contents there were small brown streaks, which consisted of granular blood-pigments, numberless fungi, and yeast cells; in this case the swallowed bacteria unquestionably kept up a constant state of irritation of the gastric mucous membrane. Dr. Simon reports a similar case in which gastric trouble was treated without relief for some time, when it occurred to him to examine the plate, which he found in a condition similar to that in the case mentioned above; when the foul condition in the mouth had been properly remedied, the gastric trouble immediately improved. The importance of examination of the oral cavity must not be overlooked. Absence of teeth, or their defective condition, and improperly cleaned artificial teeth detrimentally affect the stomach; in the latter case probably from direct extension of catarrhal processes.

Acute stomatitis, simple or erythematous, the commonest form of inflammation of the mouth, is frequent at any age; it is often associated with dentition and with gastro-intestinal disturbance; it may be limited to gums or lips, or extend over the whole surface of the mouth and include the tongue, producing redness and dryness of the mucous membrane and swelling of the tongue, which is furred and indented. In aphthous stomatitis, small, slightly raised spots from two to four millimeters (one-eighth inch) in diameter, surrounded by red alveolar spots, appear as vesicles, which rupture, leaving small ulcers with grayish bases and bright red margins, seen most frequently on the inner surfaces of the lips near the edges of the tongue and cheeks. It most frequently attacks children under three years; it may occur as an independent affection or in conjunction with an attack of indigestion.

Shech (*Krankheiten Mundhöle*), in addition to malformations and inherited disease or acquired defective forms of the mouth, describes sixteen distinct diseases of the human mouth. Seifert (Penzoldt and Stintzings's "Handbuch des Spez. Therapie," Bd. IV) describes twenty-three mouth diseases. In the primary form all these arise in the mouth and occur as secondary forms in acute inflammatory conditions of the digestive tract, especially after infective diseases. A critical review of the etiology of gastric disease cannot fail to evince the fact that the prominent causes can and generally do affect alike the mouth and stomach. Gastric diseases in which the tongue and mouth are least affected are those associated with little sepsis, as ulcer, hyperacidity, and neurasthenia gastrica; whereas where there is much gastric fermentation or histological changes take place in the mucosa, the trouble may extend to the mouth or may involve through circulatory or nervous channels, as in gastritis, carcinoma, or dilatation. (Hemmeter.)

To sum up, the symptoms with which we are concerned are,—

Nervous gastralgia—tongue variable, often pale, with indented edges; no change of taste in the mouth; frequent dryness, although there may be salivation.

Gastric ulcer—tongue dry and red, with a white stripe down the middle; smooth and moist or lightly coated. Hemorrhage, sometimes confused with blood from the esophagus, from the gums, or after extraction. Taste unchanged. Digestion of starch foods retarded.

Gastric cancer—tongue pale and furred; pasty, insipid taste; absence of HCl.

Chronic gastritis—tongue seldom clean, coated not entirely, but at base. Aphthæ form at edges and cause much annoyance. Movement serves to keep the tongue clean; if teeth are missing, aphthæ are thicker at that point.

I might, in conclusion, state that it has been aptly said that "Indigestion is the remorse of a guilty stomach." And we will all agree with Shakespeare that "there was never yet philosopher that could endure the toothache patiently."

ALKALINE SALIVA.

BY M. H. FLETCHER, D.D.S., M.D., CINCINNATI, OHIO.

(Read before the Ohio State Dental Society, December 5, 1899.)

MILLER says, "The saliva of cattle, sheep, dogs, rabbits, etc., is essentially strong in alkaline reaction." This may account for their perfect digestion, as well as their immunity from decayed teeth. This is not true of mankind, however, and in order to compensate for the physical defects of civilization, caused by eating prepared foods, the mouth should have conscious and continual attention. One demand seems to be that the saliva be artificially restored to its normal alkalinity.

Decay of the teeth may be arrested, or at least proceed very slowly, when the saliva is normally alkaline; the contrary is held to be true by some, but, as stated, it is probably due to the strong alkaline saliva of animals that their teeth do not decay. The exception to this rule is found in domestic animals, or those kept as pets or in confinement and fed upon prepared foods.

Lactic acid is formed in the mouth by the action of bacteria upon all cooked starches, and is thought to be the great cause of decay of the teeth. A small portion of some of the sodium compounds dissolved in the saliva quickly penetrates the irregularities or cavities in the teeth, neutralizing the lactic acid of this ferment, as well as other acids found in the mouth.

The promptness with which sweets penetrate cavities in the teeth, producing pain and assisting decay, gives a hint as to how to try to arrest this process. The saliva is already in the places where the damage to the teeth is being done, and by utilizing it to dissolve a suitable alkali the seat of the trouble is reached at once.

Normal saliva is slightly alkaline, but the alkalinity is so weak that few mouths are capable of prompt recovery from an acid condition; neither is the alkalinity usually strong enough to counteract the acids of decay, hence it seems rational to endeavor to supply this deficiency.

The mucus, of which the saliva is partly composed, does not dissolve in water, ether, alcohol, or dilute mineral acids, but dissolves readily in alkaline solutions; hence any attempt to wash the saliva from the cavities in and about the teeth with anything but an alkaline solution is much like trying to remove grease without soap,—the undisturbed globules of mucus remaining filled with micro-organisms. The foregoing seems to indicate that an alkaline fluid is needed at the "portal" of the body for protection.

It is an accepted fact that the mouth is constantly inhabited by numerous germs, many of which are disease-producing. Within the short space of an hour the particles of food remaining in the mouth become filled with microbes of many varieties. Saliva freighted with these germs being constantly swallowed may produce fermentation in the stomach, which results in eructations, sour stomach, headache, etc. Clinical experience shows that a small portion of a suitable alkali allowed to dissolve in the saliva and swallowed will quickly correct the disorder.

If the saliva is kept in its normally alkaline state, or in excess of normal, many of the acid-forming, fermentative, and putrefactive processes are prevented in the mouth; the saliva being swallowed in this purer state assists digestion, instead of interfering with it.

The physiology of the mouth and stomach are so related that a remedy which will arrest putrefaction and fermentation in one organ may do so in the other, and mild alkalies are most accepted for this purpose; some form of soda being oftenest used, that of bicarbonate most frequently; this particular form is objectionable, however, because alkaline carbonates are utilized in producing lactic acid.

Considering the subject from the foregoing standpoint, the writer has for a period of years had it in mind to endeavor to meet these demands with a suitable mouth preparation, and for some months past has been experimenting to this end. The method of procedure was about as follows:

All things that were considered inefficient or objectionable in existing dentifrices and mouth-washes were excluded. The pulverized chalk, sea shells, pumice stone, cuttlefish bone, etc., seem always to have been used, and with the idea of polishing the teeth; but this is not what is needed, for their natural surface is the best; anything which polishes also wears. The object, then, should be to keep them clean, and no more.

As far as the mechanical part of a dentifrice goes, if the earthy matters usually employed are coarse enough to really cleanse the teeth, saw-toothed and other abrasions may follow with their evil results; and if they are so fine as not to produce this effect, little good from their use can follow. Dr. A. H. Peck's analysis of a number of mouth preparations proved that but one of many had the essential feature for the purpose desired,—viz, that of alkalinity.

The only soluble alkaline preparations known to the writer which have been much used for the mouth are those containing soap; but soap merely lubricates each particle of the powder and the bits of food about the teeth, causing the brush to slip easily over, instead of removing them. Soap will relieve the mouth of oils and mucus, as it will the skin, but does not remove the tartar nor destroy bacteria. Toilet soaps, as a rule, are not strongly alkaline, therefore cannot neutralize the acids of decay to any great degree; nor can they be relied upon to cleanse or purify sufficiently.

The foregoing facts necessitated a new start, the demands being as follows:

First. To find a mechanical cleanser that would not abrade, and that a dentist might conscientiously recommend and a patient feel free to use without danger of injury.

Second. The saliva must be utilized for dissolving an antiseptic and antacid, so that the cavities of decay would be penetrated by it, thus arresting caries and, if possible, prevent its recurrence by continued use; the acids found in the mouth from any source must also be counteracted.

Third. Something must be found which would act upon the mucous membrane, for the purpose of keeping it in health or restoring it when it shows signs of disorder; also which would be a suitable treatment for lesions of the gums or mucous membrane.

Fourth. With all these demands it was necessary to find a combination the ingredients of which would be agreeable to each other and acceptable to the stomach, for the saliva passes in almost a constant stream to this organ; a fact too little considered in treatment of the mouth.

Giving the results of months of experiments without many details, the mechanical cleanser and menstruum was first taken up; something softer than the softest ivory must be used, so wood fiber of many kinds was first tried, with the result of making a very efficient dentifrice from cedar, boxwood, sandal-wood, and other very fine sawdusts; but each had its own peculiar flavor, many of which were undesirable; some giving up tannic acid, also objectionable; and the woody fiber remained about the teeth and under the tongue, with a disagreeable effect.

Finally the raw, hard parts of various cereals were taken up with better results, and those of rice and Indian corn selected as being the best; these are to be used in the form of a coarse flour. This material is of itself a most efficient dentifrice, cleaning perfectly without injury. The little blocks from the grains are like so much fine sand or emery in appearance, but are very much softer than the softest enamel or dentin, consequently cannot abrade them; yet they are harder than the particles of food and of most deposits of tartar; and being usable in so much coarser condition than earthy powders, they are much more efficient, which a trial will prove.

The argument has been advanced that this material, being starchy, would only assist the fermentative process in the mouth; this position is untenable from the fact that starch cannot ferment until it is hydrated, and is only hydrated quickly by moist heat or caustic alkali.

As to the chemical part of the question, many things were considered, and from various standpoints. Sodium borate and potassium chlorate were finally decided upon as being the most suited to all the conditions and to each other; they have proven to be clinically what they promised theoretically; the valuable therapeutic properties of both remedies are familiar to physicians and dentists.

In the first place, they are only slowly soluble in the saliva, and both act as the best mechanical cleansers before they dissolve. They are both alteratives, tending to restore the mucous membrane when it is abnormal, and each acts as a complement to the other.

The borate gives a decided alkaline reaction with litmus paper; first it is strong of the soda, changing into a sweetish alkaline taste, which is very agreeable in effect. The meat packers of the United States alone use one thousand tons of borax yearly as an antiseptic. It is used in antiseptic surgery to quite an extent, being free from irritating properties; and is an excellent dressing for wounds, ulcers, abscesses, etc. Dr. Walb found that a five per cent. solution of it would keep fibrin perfectly fresh for nineteen days.

Its value in medicine grows out of these properties, in addition to its peculiarly detergent, mildly stimulating, and alterative action upon the mucous membrane. In ulceration, diphtheria, and other inflammations of the mouth crystals of it are allowed to dissolve slowly in the saliva. In solution it is also largely used in skin-diseases. The internal dose is from thirty to forty grains.

Potassium chlorate and its medicinal properties are well known. It gives a neutral reaction with litmus, and will promptly change acid saliva to neutral. Like borax, when locally applied it is an alterative and stimulant to the mucous membrane, and is equally valuable with borax for the various lesions of the mouth, but seems especially valuable for stomatitis and pharyngitis. When taken internally it is continually eliminated with the saliva, coming in perpetual contact with the mucous membrane, thus continuing its beneficial work until entirely excreted by the kidneys. The internal dose is twenty to thirty grains. It is held by some to be an oxidizer, and in this way to purify and disinfect the mouth and stomach.

Another reason for its selection is its saline taste, and its consequent stimulation to the flow of saliva. Alkaline saliva seems an undoubted aid to digestion, and if it can be induced to flow and be kept alkaline many stomach disorders will disappear.

The two remedies act most beautifully together, each as a complement to the other, without danger of overdosing. The mucous surface, becoming inured and hardened to the action of these remedies, would naturally have a greater resistance to disease of any kind.

The materials being selected, they had now to be combined in the proper proportions to assist each other and to produce the desired results. Clinical test was the standard selected to decide these points, and the preparation is now used very efficiently in the following proportions:

Pulverized cereal, 75 per cent.;
Sodium borate, 17½ per cent.;
Potassium chlorate, 7½ per cent.;
Orris and menthol to flavor, and saccharin to sweeten.

The flavoring and sweetening can be varied to suit taste.

It requires at least five grains at a time of any powder to be at all efficient in cleaning the mouth and teeth, and double the portion is better. In every five grains of the above formula there is one and one-half quarter grains of the combined remedies; this is sufficient to keep the saliva decidedly alkaline for some time after using. Its preservative and antiseptic properties are shown from the fact that ten grains of the powder taken into the mouth and held until dissolved, then ejected into a test tube with a drachm of saliva, remained pure and unchanged for forty days, the tube remaining unstopped.

It seems apparent that with this prescription teeth can be cleaned without injury, and that decay may be arrested. A small portion or a tablet made of it allowed to dissolve slowly in the mouth at frequent intervals would tend to arrest decay, if it did not prevent it. There seems little question but that caries might be prevented if it were practicable to keep the teeth constantly bathed in a fresh strong solution of the powder. If we assume this to be true, then the nearest approach that can be made to it the better for decaying teeth. Dr. E. S. Talbot, who has been prescribing it for months, claims it to be a most valuable adjunct in the treatment of pyorrhea (interstitial gingivitis), and my own observations coincide with his. There are others here who have had experience with this formula whose criticism would be acceptable, as will that of any one.

A Plastic Filling.

BY H. B. TILESTON, D.D.S., LOUISVILLE, KY.

(Read before the Louisville Odontological Club, Feb. 3, 1900.)

About ten or twelve years ago I wrote a paper bearing the above title and read it before the Kentucky State Dental Society, and it was published in the *Dental Review*. The paper described a plastic filling-material made by combining oxyphosphate of zinc mixed in the usual way, and alloy, amalgamated also in the usual way, the two being incorporated together in a plastic mass.

Shortly after this an article appeared in the Dental Cosmos by a dentist in Germany in which this combination was mentioned, and quoting from my article in the *Dental Review*.

In the issue of the Dental Cosmos for November last is an article by Dr. D. D. Smith, of Philadelphia, on "The True Status of the Pulpless Tooth," which paper was read before the National Dental Association last August, in which the writer mentions this combination as valuable for setting porcelain crowns similar to the Bonwill crown. A foot-note at the end of the article is as follows:

"The mixture of cement and amalgam above referred to forms a practically new cement. My attention was first called to the valuable properties of this cement by Dr. L. C. Taylor; afterward I had the pleasure of seeing it elaborately demonstrated by Dr. Clinton W. Strang. It is produced by first preparing a mix of amalgam as for filling, and following this immediately by mixing a good cement as for same. While the amalgam and cement are still in working condition they are incorporated by mixing together in about equal parts. The resultant compound takes much more the nature of the cement than the amalgam. The color is sparingly improved, but the adhesive properties are greatly increased in the new cement. It attaches itself very tenaciously to the dry dentin, and stands the wear of mastication much better than any plain cement. This mixture of cement and amalgam is valuable in many cases in practice, and should be more generally known."

Since my former article appears to have passed from the memory of man, and the glory, such as it is, of having first brought this material to the attention of the profession seems to be about to rest upon others, I thought it would not be out of place, nor without profit to my fellows, to again present it to the members of the Odontological Club.

Before entering upon any suggestions as to special cases in which this material is notably applicable, I will describe the material itself and the method of mixing.

Ordinary alloy should be used, and not the recently introduced quick-setting varieties. On the mixing slab should be placed a quantity of oxid of zinc powder and a quantity sufficient of the liquid. Now mix the alloy in the usual way, but do not express the mercury, unless in considerable excess, as a very dry mix is difficult to incorporate with the cement. Mix the cement as usual for use as a filling, and immediately mix in about an equal quantity of amalgam, using a stiff steel spatula. The white metal or bronze spatula should not be used, as it is acted upon by the mercury. Now you have a stiff plastic mass, which may be rolled between thumb and finger into a convenient pellet and placed entire in the cavity, pressing carefully to place with smooth burnishers. A perfect contour may be built up without the need of a matrix.

The mixture is extremely adhesive to the dry cavity walls, and no definite retaining shape is needed. Some of the amalgam may be saved unmixed with the cement, and can now be burnished over the surface of the combination filling, to which it adheres almost greedily, and thus a pure metallic surface, like a veneer, be given it which is as durable as an amalgam filling. Or a quick-setting amalgam, like Fellowship or Twentieth Century, may be employed for the veneering.

In color this combination is like amalgam, but is more granular in appearance, and in its working properties resembles stiff cement. When hard it takes on a metallic luster under the burnisher, and if sawn through it shows a metallic surface. It is less soluble in the oral fluids than oxyphosphate cement, but less durable than amalgam alone, except when veneered with amalgam as described.

Its advantages over amalgam are, first, its adhesiveness, which property makes it applicable to cavities in which, for any reason, a retentive form cannot be obtained; second, the rapidity with which a large cavity can be filled, a valuable item where dryness cannot be long maintained, and making it unnecessary to employ the rubber dam in many cases; third, the ease with which large contours may be made without using a matrix.

Its advantages over cement are its greater hardness and durability, but it is less agreeable in color; hence should be employed only in the posterior teeth.

This mixture, when veneered with amalgam, is better than a cement filling in combination with amalgam as usually employed in deep cavities, for the reason that in the former case the pure amalgam attaches by amalgamation with the mixture beneath, and the union is more intimate and complete than when merely stuck to the surface of the cement after the latter has been placed as a floor in the deeper portions of the cavity.

The thermal conductivity of the mixture is naturally somewhat greater than that of cement alone, and less than that of amalgam alone.

This combination furnishes a really valuable material, and one that has no equal in certain cases of frail teeth or inaccessible cavities. Take, for example, a bicuspid, either upper or lower, with a distal cavity opening upon the occlusal surface, and so extensive as to have destroyed nearly all the dentin of the crown, leaving a mere shell of enamel, too frail to support a metallic filling, but rather needing itself to be supported. An oxyphosphate cement filling would evidently hold it together and preserve it for a time, but the temporary character of the material makes it undesirable to use in such a case. A combination cement and amalgam filling will support the walls as well as cement alone, and prove much more durable.

It is particularly useful in those large spreading cavities on the buccal surfaces of third molars, upper or lower, which, in addition to being inaccessible, are frequently so sensitive that shaping for definite retention is impossible. The adhesiveness of the mixture and the rapidity of manipulation of which it is susceptible make this material eminently valuable in such cases. It is also peculiarly applicable to badly broken-down first molars in the mouths of children, and for filling large cavities in the temporary molars. And it is useful, too, in cementing certain varieties of porcelain crowns.

A great variety of cases will occur in practice in which this combination of cement and amalgam will prove to be just what is wanted, and I earnestly recommend it to you.

PROCEEDINGS OF SOCIETIES.

OHIO STATE DENTAL SOCIETY.

FOLLOWING is the discussion on the paper of Dr. H. J. Custer, printed in full at page 228 of the current number:

Dr. TAFT. My experience has been that in almost every instance where there is a condition of the antrum as described in the paper there is always more or less of a marked mental change or impression that is adverse to the physical well-being of the patient, and this is doubtless many a time altogether overlooked. There is no doubt that this should be utilized in a sense in making a diagnosis. I would like to ask Dr. Custer if he has not found this the case in nearly every instance.

Dr. CUSTER. Yes. In my experience I have found it so.

Dr. TAFT. This condition is also noticed when the sinuses above the orbit are affected, but it is not so marked or pronounced as in the larger cavities, such as the antrum. The larger surface involved, the more general the condition of malaise. So I say this should be taken into account. I have no doubt that if due discrimination was always made the diagnostician would be very much benefited. Of course we must have the history of the case. Patients can give very much information if correctly questioned, and many times I think a diagnosis is faulty because of want of the utilization of all the facts.

Dr. J. R. OWEN. I would like to ask Dr. Custer what stimulating and antiseptic washes he has found most satisfactory in such cases.

Dr. CUSTER. I have found boracic acid, also a two per cent. solution of formaldehyd; and sometimes I have used nothing but sterilized water, simply washing out thoroughly, especially if I have good access.

Dr. H. A. SMITH. Why is it that more of us are not interested, as is our friend Custer? When we anticipate a lesion of this sort we confine our investigations to the maxillary sinus, leaving out of consideration the disorders in the other related sinuses. Dr. Cryer has, I think, shown the importance of this very conclusively. We must examine the other sinuses. We are not broad enough for that as yet; it is therefore a hopeful sign to have such a paper as this read, and it should impress upon us the importance of consultation in these cases. It would be especially profitable to us if in Cincinnati we had such a specialist as Dr. Custer.

The point which Dr. Taft brought out is excellent; we fail to take into account the mental condition of patients too often in our diagnosis. If you go into an insane asylum to-day you will find people insane because they have empyema of the antrum or related sinuses, and those in charge of the patients do not recognize the impressions these diseases make. We often have cases where we suspect empyema of the antrum and treat it without success, and we never investigate for inflammatory conditions in the frontal sinuses. We do not take the mental conditions into consideration at all. The patient may complain of pain not located in the antrum; when this is the case it is beyond the scope of our present investigation. The continuity of these sinuses alone should lead us to investigate further. Why is it we do not consult each other? We must do these things in order to get our education. I congratulate our friend Custer that he had a laboratory education in the dental profession.

Dr. M. H. FLETCHER. There is one thing which was not discussed by the essayist which probably would have been discussed if he had chosen to include it, and that is the etiology of these cases.

It is a question in my mind as to whether the diseases of the maxillary sinuses are more largely to blame; that is, whether they are more largely caused by the teeth or whether by intra-nasal disorders. It has been discussed a great deal by those interested in this topic. Five hundred skulls were examined with this idea in view. It was a remarkable fact to me that few teeth projected into the antrum; in the majority of cases there was only a thin layer of bone, and sometimes much cancellous bone, even above the apices of the teeth. On the other hand, there were many found in which the teeth penetrated into the antrum. In these cases the roots are simply covered with soft tissue during life. Assuming this to be true in the case of empyema of the maxillary sinus with engorgement, and finally becoming chronic, the floor of the antrum would naturally give way first, because of constant covering of pus; so if this be true the nerve- and blood-supply to the teeth, which hold such a position to the floor of the antrum, would become destroyed in the course of time.

The symptoms as cited in the case show that the teeth on the side affected were all sore and involved. Now, generally, as I see the maxillary sinus filled with pus, I look farther than the teeth for the cause. The pressure on the teeth which had no bony covering would push them down from the socket, and would naturally produce inflammation of the peridental membrane. That patient appearing in the dental office for diagnosis, the operator would examine the teeth and would discover considerable inflammation about the roots of those involved, and he would be very apt to say there is the cause of the trouble. I know that a few years ago it was thought that the teeth were more largely to blame than any other cause for these conditions. Looking at it from this standpoint, the teeth would be blamed immediately, where it is largely the reverse. I call this to your attention, that most of these cases are looked upon as strictly dental cases, and we examine teeth only. If a tooth is tender on pressure, you would say there must be something wrong with the tooth.

I would first investigate the intra-nasal condition. Take the history of the case. Find out what the trouble is, and be sure you do not have intra-nasal trouble with maxillary engorgement. I am free to admit that there are many cases of antral trouble coming from the teeth, but my own experience in treating these cases reveals the fact that when they are due to dental abscesses recovery is very rapid, and more so than when caused by intra-nasal troubles.

I have found nothing in my own practice which has given me more satisfaction and a more thorough means of diagnosis than that of transillumination. It is not a hard matter to arrange for this work. A simple lamp-socket holding a three- to six-candle-power lamp can be operated by one who has the skill to be a good dentist. If not on the market, you can make one yourself. If the lamp burns out, it is a matter of ten to fifteen cents to get another. It is well worth your while to have the apparatus at hand to diagnose these troubles. The prognosis of these cases many times is very bad. The healing or recovery, as I believe Dr. Custer will bear me out in saying, is very slow, especially if they are caused by intra-nasal disorders. If they are from the teeth they recover much more rapidly.

Dr. Custer. Referring to the matter touched upon by Dr. Taft, as to mental symptoms exhibited, it has been my experience that in chronic empyema there is more pronounced mental disturbance from the antrum than from any other sinus, because, on account of larger amount of surface of mucous membrane exposed, there is increased absorption, and because drainage is not so good here as in other sinuses. In confined suppuration I rather think the mental symptoms will be a little more pronounced in the upper sinuses, because of their proximity to the cranial cavity.

In the prognosis of a case, as mentioned by Dr. Fletcher, it is always well to consider the nasal passages along with the teeth. Maxillary lesions depending on dental troubles respond more readily than those depending on nasal troubles.

Question. How do you determine when the sinus is full of pus?

Dr. Custer. By transillumination. It gives a different shadow.

H. F. Harvey, D.D.S., Cleveland, Ohio, read the following paper:

A New Form of Clamp.

The program calls for a new form of clamp. Sometimes we present something which we think is very new, and we find it is quite old.

We have many forms of clamps on the market very well adapted to the ordinary forms of teeth, but occasionally they are utterly useless. I think all of us have had the experience of finding teeth on which it was very difficult to get any clamp to hold and retain the rubber satisfactorily, especially those molars which are not thoroughly erupted or are very conical in shape and having many abnormal forms.

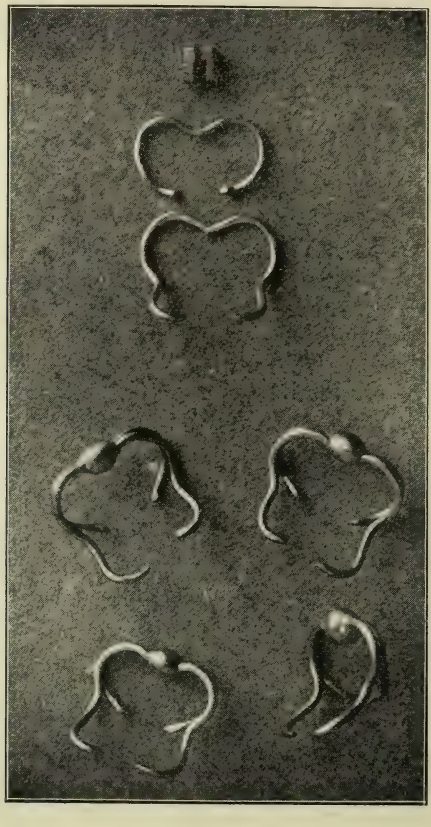
The clamp I have been using in such cases is one of my own design, and has given some satisfaction, and I think perhaps embodies a different principle from any that has been applied before. You are familiar with the anatomical form of the molars; the largest part taken bucco-lingually is very near the gum-line, and sometimes it is even below this, especially in teeth not fully erupted. In these cases it is necessary to force the ordinary clamp down quite a way to get it to hold, and sometimes then we are not able to do it; and all of this is not very pleasant to the patient.

If you examine the tooth from the other direction, mesio-distally, you will find the crown quite well shaped, the largest diameter being near the occlusal surface; and if you can get a clamp which reaches around the angles of the tooth and get a grip mesio-distally it will hold without going so low, and that is the principle utilized in the new form of clamp.

This clamp, instead of being made of one piece of flat steel, as they usually are, is made of two wires of different sizes and united in the center of the bow, as I will show you.

I have used different materials,—German silver, steel wire, etc., united together with soft and hard solder,—but lately I have adopted piano-wire and soft solder to bind together; in this retaining the temper of the wire, which is better than any I am able to give it.

The drawings will give you an idea of the clamps and their separate parts. The anterior wire is heavier than the one back, because the leverage is greater, and you need a stronger spring. The points are bent around to grasp the tooth in the mesial and distal angles. These points adjust themselves until the forces are equalized where the forces of pressure of each point will be directly toward the center or long axis of the tooth. Each point acts independently of the other, so you do not get any rocking of the clamp, the grip being at the extreme ends. Also, if you force the clamp down they are not so painful as other clamps where you have a single surface. This form of clamp is not as well adapted to teeth having large approximal cavities, unless the points can be carried below the cavity.



1, Matrix; 2, Posterior Wire; 3, Anterior Wire; 4, 5, Pair for Upper Molars; 5, 6, Pair for Lower Molars.

The size of anterior wire is .043 inch, or 19 English gauge; that of the posterior is .036 inch, or 20 English gauge. In bending the wires to proper form I use a pair of ordinary bending pliers, first making the depression in the middle of the bow, and continue the bending each way, finishing at the points.

It is necessary to slightly flatten both surfaces of wires where they come together and set in the matrix, to prevent rotating. The depression in the bow at the point is for this purpose also, as it gives greater bearing surface. The points that come in the matrix should be of steel, and I make them by filing out of an old excavator handle.

The wires must fit closely (tight) in the matrix, depending on the soft solder only to hold parts in position, and being careful that it does not flow far from the matrix. The matrix is finished up after soldering. The tension of the clamp may be varied somewhat by the size of the bow as well as the size of wires.

I have here a number of teeth set in plaster which vary considerably in form and size; also one of the clamps. I will pass them around with the clamp forceps, so you may see the clamp and its adaptability to various forms of the teeth.

Discussion.

Dr. C. R. BUTLER, Cleveland. I have a few words to say in commendation of the clamps which Dr. Harvey in his modesty has presented. There is a principle embodied that I have not found in any other form of clamps. I have put them to a practical test, and find that there is adaptation of considerable range. These presented are for the molars, but they may be made for bicuspids as well.

Dr. H. L. AMBLER, Cleveland. The Harvey clamps are both unique and practical. They are unique because they are made from piano-wire; and as we often say of many inventions when we see them, "It is a wonder that some one did not think of them before;" but it remained for Dr. Harvey to produce this invention, notwithstanding dentists and manufacturers have been making clamps for thirty years. They are practical because they have a bearing on the teeth both mesio-distally and bucco-lingually, owing to their peculiar construction, and also because with a pair of pliers they can be slightly changed in form and made to fit a little larger or a little smaller tooth, or an abnormally shaped one. In cases of partially erupted molars they will hold on better than any clamp with which we are familiar.

Dr. HENRY BARNES, Cleveland. Dr. Harvey loaned me his clamps for a few days, and explained how they were made. They are simple of construction, yet difficult to shape at first. They are the best form of clamp yet devised, in that they are automatic in their action; out of one's way especially when operating upon cervical cavities in the molars. They can be used when no other clamp will hold, and are not as painful as are other forms.

Dr. W. T. JACKMAN, Cleveland. Through the kindness of Dr. Harvey I was permitted to try this new clamp on a conical upper right second molar, a tooth on which I used, or tried to use, an exceedingly convex (gumward) clamp, and one almost stiff enough, apparently, to crush the tooth, but it would not hold. With the Harvey clamp I adjusted the rubber, used a dam-holder with three points of attachment, drawing the corner of the mouth well back, yet the clamp held nicely till I inserted three fillings in crown cavities, and, to my surprise, on removing it it seemed to have but slight hold; but it clamped in such a way that slipping was practically impossible. It will no doubt prove to be an excellent aid to the armamentarium of the operator.

Dr. J. F. STEPHAN, Cleveland. Having had the opportunity during the past few weeks of using the clamps Dr. Harvey has shown us, I would like to say a word in appreciation of their good qualities. They certainly fill a long-felt want in being so nearly universal, and especially in fitting those cases where the crown is only partially erupted. In these cases the mesio-distal force is brought into play, and it is surprising how firmly they hold, exerting as little force as they do. I think it will be impossible to injure the enamel of a tooth by using one of these clamps. The fact that they can be bent so as to fit the crowns of malformed teeth is a very valuable feature, and one which will certainly be appreciated. I believe they deserve special notice, because they will help us when all other clamps fail.

Dr. FLETCHER, Cincinnati. For one I feel very grateful to Dr. Harvey for having presented to us what seems to be the fulfillment of a long-felt want in the principle of making clamps, for what he has produced certainly must be efficient and satisfactory; and I wish to thank the doctor for what he has done in that line.

PENNSYLVANIA STATE DENTAL SOCIETY.

(Continued from page 98.)

FIRST DAY—*Afternoon Session* (Continued).

DR. E. NEVINS STUMP, of Washington, D. C., read a paper entitled "The Prevention of Tooth-Decay."*

Discussion.

Dr. GUILFORD. I only want to say a word in regard to Dr. Stump's paper. It is a good paper, fresh and right to the point. I think the dentist of the future will rely upon prophylaxis more than in the past, and I am satisfied, in my own experience, that a vast amount of good can be done from antiseptic barriers set up against the inroads of caries by prophylactic measures which are at the hands of every practitioner and patient. In other words, absolute cleanliness is the key to the situation. My own experience and recommendation is to brush the teeth not before breakfast, but after breakfast, after dinner, and after supper faithfully, with an alkaline substance; it don't make any difference what. And I can testify from personal experience extending over many years that it makes a vast difference in the teeth. There is not one-half or one-third of the caries in a mouth thus treated that you would ordinarily find.

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*Printed in full on page 20 of the DENTAL COSMOS for January.

I have had patients with a bad family history that have in this way shown good results; it not only makes a decided difference in their teeth, but also makes a decided difference in my bank account, relatively so. I think Dr. Stump is all right in his point.

Dr. TRUMAN. I was in hopes that the essayist would extend the subject, as it is capable of being extended very considerably. I am of the opinion, and have been all along, that prophylaxis is to be the main object in the future of dentistry. It has been too long neglected. The idea is, or should be, that decay can in a large degree be prevented by a careful attention to cleanliness of the mouth. We all know that. It has become a truism with us, but how many of us practice it in our instructions to our patients? How much do our patients know about it,—about the necessity of that thorough cleanliness in order to prevent decay? And, further than that, are they made aware of what their oral secretions are,—that they change every twenty-four hours, as the essayist has said? Leaving out all bacterial ideas, that acid is the primal cause of caries. At certain stages of the twenty-four hours acid is present to a greater degree than others. During the day-time you can hardly ever get an acid reaction in the mouth. You can always get it, or that is my experience in experimentation, you can always get it in the mouth at night. Patients should be taught, in my opinion, that at night especially will decay progress with greater rapidity than at any other period of the twenty-four hours, and they should be instructed, especially in matters of erosion, to use antacids in the mouth before retiring; either lime-water or prepared chalk, or magnesia, in the mouth on retiring, and allowing it to remain there. All these little treatments, besides cleansing thoroughly, will prevent decay. It won't put money in our pockets, but it will put health and comfort in the mouths of our patients.

Dr. WILSON ZERFING. There is a great deal said about cleansing the teeth and instructing patients to properly clean the teeth as a means of preventing decay, but, unfortunately, I think we do too much talking without the proper demonstration. In other words, we tell them to properly cleanse the teeth; we tell them to brush them three times a day. We tell them to do it a little better and get at the bad places a little more, and they come back with no improvement apparently, and it becomes very monotonous. In a few minutes, taking the brush yourself, if you properly understand it,—which I am afraid many of us do not,—you can show a patient more than you can talk in a half-hour, and give them some benefit; whereas you can repeat the words over and over again without any results. I believe there are too many among us who do not ourselves give proper attention to our own teeth. We tell others what to do, but we don't do it ourselves; in fact, don't know how to do it, and do not set an example by demonstration. I think if we would pay a little more attention to ourselves and give our patients a little personal instruction, we would do more good than with all the talking we can give them.

Dr. H. C. REGISTER. I have given a little attention to prophylaxis in the last few years, and I have been crediting to sterilization the good results that I believe I am getting in comparison with the percentage of decay which occurs to those individuals prior to treatment of that kind. I am particularly interested in persons where they have a recurrence of caries presenting cases extremely difficult to save by the ordinary methods of mechanical manipulation, and am very strongly encouraged by the methods I am pursuing, believing, as Dr. Truman has said, that the future of dentistry will consist largely in the practice of germicidal methods, in that way anticipating caries, instead of waiting for it to occur. There is no doubt in my mind that the evolution of conditions in which man is living to-day in the higher walks of civilized life is creating a condition of caries which did not formerly exist. It has been shown, and shown conclusively, that in order to have caries you have got to have something to produce it that is tangible, and I think it has been pretty thoroughly shown us that it comes from bacteria in the mouth. My practice in the past has been to pass the patient through a course of germicidal treatment every six months or oftener. I find by examining the teeth or the tooth-structure, dried under a rubber dam, we can see the incipient caries commencing in many cases that is quite unsuspected without such an examination. I find it cannot only be found, but restored and checked so that the potential, as we might say, of the territory in which caries is going on is raised to such an extent that the bacteria cease to act.

I applied in these cases the rubber dam, using a sterilizer of some kind. In the more general practice the use of dam is not essential. Among those we have to select from, where we want to set or fix the accumulations always upon the teeth, I find iodin and alcohol, equal parts, to which is added two to four per cent. formalin, meet the first conditions. To Dr. Francis is due the honor of first using iodin, and under judicious use its good results are very pronounced.

In studying up horticultural work, I find there are certain fungoids much of the same character or nature as the bacteria of the mouth. That is, they are oxygen consumers. I have been experimenting somewhat lately with a very common material which is used by horticulturists; that is, a kerosene emulsion. I have been using it only in a limited way, and at present I am not able to make any report; but I am inclined to think it will produce quite good results. Other germicides I have used consist of formulas of a certain percentage of essential oils known to be germicides, formalin, salol, iodoform, etc. After the tooth has been thoroughly dried under the rubber dam the tooth is painted with this preparation, and it is remarkable what a change is made in the whole character of the tooth. I have never been able to approach the cleansing influence in any other way. I believe that as the years progress, and as we know more about this condition, which is a growth in the mouth which destroys the tissues, we will be able to entirely kill the cause, rather than to have to cure the case, as heretofore.

Dr. S. B. Luckie. In the cleansing of the mouth and of the teeth I was very glad to hear him say that there is the cleansing of the tongue. That means the perfect cleansing of the whole mouth.

You may cleanse the teeth, and yet they remain in the same environment. Dr. Register speaks of placing the rubber dam on the teeth, thus isolating them from their environment, and then thoroughly sterilizing them, which no doubt he can do; and after having done that they go back to their old environment, and the cause of decay is still around them. Now, it is perfectly right to keep the mouth perfectly clean, and it is right for us as general practitioners to instruct our patients in the methods of cleaning the mouth, but the study of prophylactics does not stop there. The question arises, why does acidity come into the mouth? We know there is more at night than at any other portion of the day, but why is it so? Why does the human mouth need cleansing? Dr. Williams has shown the local cause of decay. He has shown the structural formation of the teeth of the human race and of some of the lower animals to be about the same, but he has never shown why decay occurs except as a local disease from local causes. So that we have to go back, in the study of caries, to a time when there was no such thing; and that brings us not only to the environment of the teeth, but to the environment of the being. What is there in civilization that is the predisposing cause to dental caries? It seems to me, like preventive medicine, preventive dentistry must take up that question.

Dr. W. H. SCHOLL stated that he had been frequently asked by patients why it is that the teeth decay. In answer to such queries from his lady patients the doctor stated he answered them that it was because the teeth were not properly cared for; that if they would take as much pains in keeping the teeth clean as they do in taking care of their hair, they would have very few decayed teeth.

Dr. STELLWAGEN (Dr. Guilford in the chair). I don't want to monopolize your time, but it is evident that this paper we have just heard is very important in two ways. First, the remarks as to the cause of the acid, and, second, the proposition to prevent the formation of it or to neutralize it. I am sorry that Dr. Truman is not here, as he spoke of the acid being found less frequently in the daytime; that is the suggestion of a long series of observations which could be made with a great deal of profit. Are acids produced in the mouth more frequently or abundantly at night than during the daytime? Do they appear, or are they found more readily at any particular season of the year or hour of the day? My own experience, verified by a number of trials in the Philadelphia Dental College, is that a very large proportion—speaking from memory, ninety odd per cent.—of the salivas of the students gave an acid reaction when tested in the lecture room with blue litmus paper. The same mouths do not always show the same percentage of acid. The reddening of the litmus in the mouths of ordinarily healthy people is diminished when they are living out-doors. This is easily accounted for. In the one case the student in the class-room for hours submits to an atmosphere that is physically unnatural, and which promotes the growth of the microbes. In the other the patient, living in the open air, has the sunlight and oxygen,—better conditions for the suppression of the growth of microbes and of acid fermentation.

We do not want this society to commit itself to the dogma that germicides and cleansing, although good measures, are all that is necessary to prevent the deterioration of the teeth. It has passed undisputed that out-door life is in value above all things for this purpose. And it is among that class of persons who enjoy the luxury of country seats, or who spend their summers at the seashore, in a word, pass much of their time in the open air, that we find the beneficial results in this particular. In my own practice patient after patient show most distinctly, by my records of the last forty years, that the period of greatest need for dental services is during and after residence in the city. The children of the family are affected by the confinement of the school-room, and the older members by that of the crowded theaters, assembly-rooms, churches, and the like. In the spring, therefore, three-fourths more dental work is often required than in the autumn. I think this is readily explained by the parable of the sower: If "seed falls upon good ground" (well prepared and with proper meteorological conditions, if we may be allowed to use the term "meteorology" of the mouth) "it will bring forth an hundred-fold," and we may have dental caries as a result. In the other case the seed falls upon ground that may be compared to the rock. It is well cleaned, and so these organs are kept in a more natural state, under normal conditions of appetite, general work, and *régime* of the patient while taking out-door exercise, all of which combine to produce a healthful life.

As dentists, as physicians, as physiological students, we should pay more attention to the soil. The studies of the seedsman are quite essential, but unless the soil is first prepared the seed will not germinate or grow to perfection. Is it more our duty to study the bacteria, which are the immediate cause of this evil, than it is to learn how to secure for the surfaces of the skin and the mouth comparative immunization, and to keep them always unfit for the propagation of bacteria? This should be done not by carbolic acid or by parasiticides alone, but by nature's method of causing these parts to be supplied with a greater amount of pure, good blood, laden with oxygen, as the result of bodily labor. The old Greeks conducted their schools and gymnasiums in the open air. They had open courtyards and closed or covered ways or corridors around the yards. They paid especial attention to the factor of the life in open air.

To-day in all probability the most successful institutions, for the treatment and arrestation of the terrible inroads that are being made by tubercle bacilli, are the fresh-air sanitaria. These bacilli engraft themselves into the deepest recesses of the lungs of human beings, where at one time they reveled unmolested. There it used to be impossible to reach them, either by bactericides or by any other means, owing to the delicacy of the tissues and the labyrinthine shapes of the air-passages and lobules of the lungs. Some of the best and happiest results of treatment have been attained in such hospitals as have adopted the out-door life.

In the *British Medical Journal,* within a month or so, there is an account of the successful working of a number of these sanitaria that have been more recently established in Great Britain. For some years, and much more perfectly, according to this report, Germany has profited by this system, although it is a land eminently fitted for the generation and propagation of the tubercle bacilli. The inmates of these institutions live, when within doors, in rooms especially fitted for bodily exercise, and take it during all kinds of weather; this, coupled with a system of *régime* largely devoted to regular training, has wrought wonders. Their records show the most conclusive results in the diminution of and successful combat against this curse of the age,—the tubercle bacilli.*

If true in pulmonary tuberculosis, how much more likely is it to be the fact with regard to the oral microbes that are much more easily and readily reached? Therefore, let us more seriously consider the importance of keeping the soil that surrounds or the atmosphere that strikes the teeth in such condition that we will have the most effective arrestation of the action of caries on the teeth.

It seems to be quite possible to banish this disease, but it will be accomplished only after a long and tedious fight, and after convincing all of our patients and all of our people that they must have more fresh air, and that it must be moving, not stagnant in our rooms. Not after the method of ventilation of to-day, but, if the new theories are correct, sufficient current even in the coldest day of the winter to cause a heavy blanket to move, if hung up. Modern builders have brought to too great perfection the exclusion of the outside atmosphere from our houses. Their construction is daily inviting the cultivation of diseases. More poorly built and more aboriginal styles of houses or dwellings would result in improvement along all these lines.

My friend Dr. E. B. Moseley, a surgeon in the United States army, some years ago told me that while in charge of a body of troops, Indians, etc., he had passed through one of the most terrific winters in the Northwest. He said the men had three kinds of quarters. Some dug caves into the side of a hill and made a sort of living house; others put up log huts, built them strong, and covered them with mud or sod; but the most healthy were those who lived in army canvas tents, in which were suspended the ordinary army blankets for linings around the walls. Those in caves suffered the most.

Dr. STUMP I have only to say, as already stated in my paper, that I think preventive treatment will be the treatment adopted in the dentistry of the future. With regard to acidity in the mouth, I have tried the litmus paper for about five years, and find that it varies in the same mouth, there being more acid on one side of the mouth at times than the other. It is strange, but it is so.

On motion, the subject was then passed.

The meeting then adjourned to meet in the evening at eight o'clock.

(To be continued.)

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*See also an interesting Clinical Lecture by Professor Graucher, of Paris. —*International Clinics*, vol. ii, July, 1898, p. 9.

MARYLAND STATE DENTAL ASSOCIATION.

THE second quarterly clinic of the Maryland State Dental Association was held in Royal Arcanum Hall, Baltimore, January 24, 1900. The afternoon session was devoted to clinics.

Evening Session.

F. F. DREW, D.D.S., Baltimore, read the following paper:

ABSCESSED ANTRUM—A PRACTICAL CASE.

As disease of the maxillary sinus is by no means a common occurrence in the daily practice of the dental surgeon, I desire to present for your consideration this evening the history of a very stubborn case in which I assisted in the capacity of consulting surgeon. I do this for two reasons: First, because I think the case may prove of interest to you; and, second, I desire to provoke a discussion of the subject which I hope will lead to a treatment which will effect a permanent recovery of the patient.

The case is as follows: Mr. B. called to consult me in regard to a violent pain in the right superior maxillary region, frontal headache, discharge of pus through the nostril, and other accompanying symptoms. He stated that he had been in the hands of a specialist, who had diagnosed abscess of the antrum, and had been treating it through the nose. As this treatment gave no relief, he suggested that he consult me to ascertain if there was any exciting cause for the trouble.

I made a careful examination of the case, and discovered on the affected side that the first molar was missing and the process apparently in a healthy condition; there was no external indication of inflammation. The second and third molars were sound and free from soreness on percussion.

From the color of the second bicuspid, which also carried a large amalgam filling, I surmised it was a pulpless tooth, and, as there was a slight soreness about it, I advised its extraction. To this the gentleman gladly consented, and the tooth was removed. The pericementum was considerably congested, and in order to see what internal treatment the tooth had received I cut it in half and found that both pulp-canals had been filled with cotton, which was very offensive. After the removal of the tooth I referred the patient back to the specialist who had charge of the case prior to my seeing him.

I lost sight of the case for six months, and accidentally met the gentleman in the car one day; and upon inquiry as to his condition, he stated that his trouble did not diminish after the extraction of the tooth, and that the specialist had taken him to a general surgeon, and together they had chloroformed him and opened up the alveolus to the antrum. To use his expression, "a barrel of pus," with the characteristic odor, was discharged, and the antrum was thoroughly washed out with a solution of sodium chlorid.

He felt much relief for a week, but at the expiration of that time his pain returned, and the discharge of offensive pus was very copious. The ethmoid became involved, and added to his sufferings. This complication was treated by the specialist and was soon overcome, but the discharge from the antrum still continued. I was called upon once more by the patient, this time accompanied by the specialist; and upon exploration I found that, in addition to the artificial opening into the antrum, there was a fistulous opening from the region of the first molar, which had been out for years apparently. The probe indicated some hard substance, which we diagnosed as either a piece of necrotic bone or the root of the first molar. As the substance was imbedded deeply in the alveolus, I slit the gum and packed the opening tightly with cotton and sandarac, which I allowed to remain over night.

On seeing the patient the next morning I found the opening circumscribed very distinctly, and the foreign body clearly defined. I then took a pair of alveolar root forceps and extracted the substance, which proved to be a well-defined root which had evidently belonged to the missing first molar. We naturally thought that the removal of this root would be followed by some improvement, but the discharge still continued in spite of antiseptic washings of carbolic acid, glyco-thymoline, and various others.

At times the patient is entirely free from pain, but, as there is a tendency for the artificial opening into the antrum to heal, thus stopping the drainage of pus, his intervals of rest are not long; and as a last resort I have constructed a drainage tube (silver), which is attached by clasp to the first bicuspid, and, as this provides the necessary outlet, he is now comparatively comfortable; but as far as a permanent cure is concerned, the specialist, the general surgeon, and myself have been baffled in our efforts, and I shall feel gratified if any of the members here to-night can suggest a remedy.

Discussion.

Dr. B. HOLLY SMITH thought that there had been too much timidity in dealing with the case described in the paper. He had considerable experience with diseases of the antrum, and for several years such cases always caused him a good bit of anxiety. If we possessed the same courage that the ordinary surgeon would have in like cases, there would be fewer failures.

In the case described an opening should have been made into the antrum large enough to remove almost the whole floor of the antrum. Then the cavity should have been packed with iodoform gauze, and then he would expect it to heal up gradually as the gauze was withdrawn. The patient seems to have had a great fear of pain, and only sought help when he was driven to it by suffering. We all have to contend with patients who are careless and indifferent, and this contention must be so firm and unceasing as to insure such treatment as in its thoroughness will bring the results we have a right to expect.

Assistance should have been had earlier, and then there should not have been so many specialists to consult with. The tooth should have been extracted at once, and the necrosed bone should have been cut away with enough of the floor of the antrum to allow of a full exploration. Gold tubes are better than silver tubes for drainage purposes, as the silver is affected by the fluids of the mouth and the pus from the cavity. The additional expense is not so great as to make much of a figure. If the cavity is opened thoroughly, such cases are readily cured.

Dr. **David Genese** said it was quite evident that the trouble described in the paper was of long standing, and in all such cases the history of the case should be sought out. There is a probability that some foreign body had got into the antrum and gave rise to the inflammation, in which case the heroic treatment advised by Dr. Smith would be necessary. His treatment usually consists in making an opening and washing out thoroughly with hot water and alcohol, using no acid, which would be apt to irritate and prolong the trouble, but gradually increasing the proportion of alcohol until pure alcohol can be used. This treatment has been successful in his hands.

Dr. **H. B. Noble** agreed with Dr. Smith that dentists were usually a little fearful and timid about making the opening into the antrum. It is necessary to open it fully, and we should remember that drainage-tubes inserted so they extend even a little way above the floor of the antrum do not drain the cavity, but form a dam and keep the pus in. Dr. Richardson, who has read papers before this society, showed the necessity of a full large opening and the use of iodoform gauze. We must see that all diseased tissue, the bony structure as well as the soft tissue, is removed. He agreed with Dr. Genese that the use of strong acid washes was liable to retard the cure.

Dr. **W. A. Mills** said the first thing is to find, if possible, the cause of the trouble, and unless a large opening is made this will not be possible. Sometimes there is an encysted tooth in the antrum, in which case it must be removed. The secretions and the tissues removed from the antrum should be examined microscopically for the detection of cancerous growths or carcinoma which may exist, and can be detected by the microscope.

Dr. **C. C. Harris** suggested the use of a tube with small holes or openings in that part that extended into the cavity. This would exclude the danger of the pus being retained about the tube, and he recommended frequent washings with mild antiseptics rather than the less frequent use of such as were strong enough to cause irritation. The patient should be taught to wash out the cavity himself, and should do it frequently. Most of such cases yield readily to treatment if the cause is removed, though some are very obstinate. He spoke of one lady who had been suffering about ten years, though she had been under treatment by a number of eminent dentists. Her system had been weakened very seriously by her suffering, which, so far, had not been more than temporarily relieved.

Dr. **Drew**, in closing the discussion, said that in regard to the charge of timidity, he had not treated the case himself. He was called upon to consult with the specialist, and, being governed by professional ethics, could not operate himself, especially as the patient desired the treatment to remain in the hands of the specialist who was originally consulted. He could not understand why it did not get well, as the opening was made free enough to admit a man's thumb; surely large enough for a thorough examination. The specialist syringed it out twice each day with carbolic acid and glycerol, but still it does not get well.

The subject was passed, and Dr. FANNIE E. HOOPES, of Baltimore, read a paper entitled "Oral Conditions in Relation to Gastric Diseases," which is printed in full at page 242 of the current number.

Discussion.

Dr. WILLIAMS DONNALLY said it was generally accepted that the condition of the teeth and mouth frequently causes gastric disorders which seriously affect the general health. In confirmation of this assertion he read quotations from a number of eminent physicians and dentists, some of which are as follows: The Surgeon-General of the United States, writing about the necessity for dentists in the army, says, "The condition of the mouth has much to do with the general health." Dr. Fitzgerald, surgeon of the Thirteenth Regiment, United States Volunteers, says, "At least half of the trouble from which our men are suffering comes from the teeth." Professor J. W. Harriman, ex-major and surgeon, Fiftieth Iowa Volunteers, says, "During my service as medical officer in the Fiftieth Iowa Volunteers I had ample opportunity to observe instances where diseased teeth incapacitated soldiers, and in some cases it appeared that indigestion and allied gastric intestinal disorders were directly produced by lack of care of the dental organs." Dr. Thos. S. Latimer, a distinguished medical man of Baltimore, says, "There can be no doubt that as many soldiers are effectually disabled by toothache, facial neuralgia, and other ailments, oral and gastric, due to lack of proper treatment, as from any other form of sickness or from gunshot wounds. Precisely as the exhaustion, exposure, and unsuitability of food incident to an active campaign, is the need of good masticatory organs. These being neglected or improperly treated, scurvy, dyspepsia, dysentery, and diarrhea are prone to ensue. Nor is there any disability from any injury or sickness, even when not connected with imperfect mastication, that is not more protracted when mouth complications exist." Dr. Robie says, "The health, strength, and courage of the soldier all depend upon the condition of his mouth and teeth."

Dr. C. J. GRIEVES said, "Dr. Hoopes's subject gives us the missing link in the circle of our physical well-being. The perfect digestion of food depends principally upon its proper preparation in the mouth. Without this the digestion is imperfect and the health of the digestive organs suffers, and the teeth in their turn are affected by the disorders of the digestive organs."

Dr. A. W. SWEENY, Washington, said it would seem perfectly plain that the digestive process was subject to the same laws that govern other processes. A good and proper start is necessary in all things, and if the apparatus involved in starting the process of digestion is not perfect the food must start on its way through the digestive tract improperly prepared, thus forcing upon the stomach extra work which would cause exhaustion and derangement of its function, producing unfavorable conditions which would react upon the teeth. It seems singular that the medical profession has not paid more attention to the influence of the teeth upon the general condition, both in health and disease, than it has.

Dr. GENESE said the influence of faulty teeth upon the general health is most forcibly shown by examination into the conditions of the poorer classes of patients, especially the children. They will be found to be poorly nourished, pale, and emaciated, though usually their food is sufficient in quantity and fairly nutritious; but if, as so frequently happens, their teeth are utterly neglected, they cannot masticate the food, and consequently it fails to nourish them as it should.

Dr. W. A. MILLS said it would be as futile to expect to get pure water from a stream whose fountain-head was polluted, as to get a fully nourished and healthy system from food when the teeth and mouth are in such a condition that they cannot perform their functions properly. He believed that fully seventy-five per cent. of the cases of dyspepsia were due to diseased conditions of the mouth and the teeth. Every dentist knew that artificial teeth which enabled the wearer to masticate his food often cured dyspepsia. Of course, not all cases of dyspepsia are so caused, but many are. He congratulated Dr. Hoopes upon the excellent paper she had read.

Dr. B. HOLLY SMITH was struck with the importance of this subject, especially as regards children. He said many of us blunder through life without taking cognizance of conditions which surround us. He had patients, not all of them sick, but some of them distressed; not all of them in the care of physicians, but many of them should be. They show evidence by pallor of their faces and ill-nourished conditions of their bodies that they fail to get the benefit from their food that they need. No doubt in many cases they fail to masticate their food properly, and their condition is due to this fact. When we recollect that a little carious cavity will prevent a child from masticating on one side of the mouth, and that two such cavities will prevent mastication on both sides, and in consequence the food must be passed into the stomach in a condition not proper for digestion, we will realize the necessity for frequent examination and careful treatment of the mouths of children. When we look into the deeper side of the subject, the effect of gastric conditions upon the teeth, there are few of us who are capable of discussing it, because we have not made the necessary observations to know what may be true.

He recommended that dentists carefully study, record, and tabulate such cases as they come under observation. He should do so himself with the confident expectation that it would be valuable not only to himself, but also to those who are to come after him.

(To be continued.)

SOUTHERN KANSAS DENTAL ASSOCIATION.

THE fourth annual meeting of this association was held in Newton, Kansas, December 26 to 28, 1899. The following officers were elected for the ensuing year: J. R. Lowe, Newton, president; B. L. Shobe, Garden City, vice-president; U. S. Hoagland, Wichita, secretary; S. B. Corn, Kiowa, treasurer The next meeting will be held in Wichita.

ARKANSAS STATE DENTAL ASSOCIATION.

The Arkansas State Dental Association met in Little Rock on January 2, 1900. The following were elected as officers for the ensuing year: W. H. Marshall, Little Rock, president; W. T. Cate, Fort Smith, and C. G. Farrow, Little Rock, vice-presidents; Wm. C. Gillespie, Fort Smith, secretary; W. H. Buckley, Little Rock, corresponding secretary; E. Collins, Little Rock, treasurer.

The next meeting will be held at Little Rock, July 2, 1900.

DISTRICT OF COLUMBIA DENTAL SOCIETY.

At the thirty-third annual meeting of the District of Columbia Dental Society, held December 19, 1899, the following officers were elected for the ensuing year: R. W. Talbott, president; H. J. Allen, vice-president; Jno. H. London, secretary; H. B. Noble, librarian; Mark F. Finley, treasurer; L. C. F. Hugo, essayist.

Jno. H. London, *Sec'y.*,
1115 G street, N. W., Washington, D. C.

WESTERN INDIANA DENTAL ASSOCIATION.

The annual meeting of the Western Indiana Dental Association was held in Terre Haute on January 11, 1900. Following are the officers elected for the ensuing year: L. H. Bartholomew, president; R. W. Van Valzah, vice-president; B. B. White, secretary; W. R. Mail, treasurer.

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DENTAL SOCIETY ANNOUNCEMENTS.

INTERNATIONAL DENTAL CONGRESS.

Report of Transportation Committee.

The sub-committee on transportation has completed arrangements with the well-known tourist firm of Thomas Cook & Sons, 251 Broadway, New York, so that dentists who expect to attend the Congress to be held in Paris, commencing August 8, 1900, may secure for themselves and families steamship and railroad tickets and hotel accommodations at the minimum of expense and trouble.

In making these arrangements the committee has taken into consideration that while some of the delegates may wish to secure only transportation from New York to Paris and back to New York, many delegates will wish to visit other parts of Europe during the summer, and they have planned the following tours to assist such in the selection of a trip that the time at their disposal and their means will suggest.

Tour 1.

A. From New York by Red Star Line Steamer "Friesland" on July 18, for Antwerp, thence rail *via* Brussels to Paris, returning same way to New York. First-class passage, providing berth at minimum rate for two-berthed room,—$157.85.

If traveling second-class from Antwerp to Paris and return, fare would be $4.65 less.

By traveling on steamers "Kensington" or "Southwark" of same line, fare would be reduced.

B. *Via* Cherbourg (North German Lloyd Service). From New York by North German Lloyd steamers "Barbarossa" and "Friederich der Grosse," sailing July 12 and 19 respectively, for Cherbourg, thence rail to Paris and return same way (twin screw service only). First-class passage, providing berth in room for two persons (minimum rate), $177.

C. *Via* Cherbourg (Hamburg American Line Service). From New York by Hamburg American Line steamers "Pennsylvania" and "Pretoria," sailing July 14 and 21, respectively, to Cherbourg; rail to Paris and return *via* Boulogne-sur-mer and Hamburg, American steamer (twin screw service), to New York. First-class passage, providing minimum fare for berth in room for two persons only, $184.25.

Lower fares can be obtained if occupying berth in room with two or three other occupants.

D. *Via* Boulogne-sur-mer (Holland American Line). From New York by twin screw steamers "Potsdam," "Statendam," and "Rotterdam," sailing July 7, 14, and 28, respectively, to Boulogne-sur-mer, thence rail to Paris and return same way to New York. First-class passage, providing minimum fare for berth in room for two passengers, $163.

If traveling second-class from Boulogne to Paris and return, fare would be $3.80 less.

Lower fares can be made by leaving on steamer "Sparndam" July 19.

Tickets can also be arranged *via* Southampton or Liverpool at proportionate fares.

Tour 2.

To provide hotel accommodation in Paris for two weeks (fourteen days and thirteen nights) at Grand Hotel du Trocadero, carriage drives for three days, including excursion to St. Cloud and Versailles, twenty tickets of admission to Exposition, and transfer to and from railway station to hotel, $65.

Tour 3.

One week's tour to Switzerland from Paris, visiting Lucerne, Interlaken, Thun, Berne, Lausanne, Lake Leman, Geneva, including hotel accommodation, sight-seeing, etc., second-class railroad, $50.

Tour 4.

One week's tour from Paris to Mayence, thence steamer on Rhine to Cologne, rail to Amsterdam, The Hague, Rotterdam, Antwerp, Brussels, Harwich, London, including second-class railway travel, first-class on steamers, hotel coupons (three meals per day, with lodging), $42.50.

Those traveling *via* Cherbourg can return by steamers of same line from

Southampton, and so make short tour from Continent through England in connection.

There is a United States revenue tax of five dollars upon each ticket, regardless of the number of passengers in whose name it may be made out.

Should any one wish to make a longer tour than any of the foregoing, or one with a different route, Messrs. Cook & Sons have such a large variety of tours already planned that there need be no difficulty in making a selection to suit the taste, means, or the time at the disposal of any one.

The war in South Africa has caused the withdrawal of many of the English steamships. Passenger accommodations across the Atlantic will be less than usual this summer, while the Paris Exposition is attracting great numbers, so that the committee wish to impress upon delegates the great importance of securing their steamship accommodations at once.

Address all communications regarding steamships, railroads, hotels, etc., to Messrs. Thomas Cook & Sons, No. 251 Broadway, New York.

A. W. Harlan,
W. E. Griswold,
W. W. Walker,
William Jarvie, *Chairman,*
Transportation Committee.

CLINICS AT NATIONAL DENTAL ASSOCIATION.

The National Dental Association meets at Old Point Comfort in June next, and the Clinic Committee are desirous of making the clinics a very important feature. The majority of the clinics will be given on models, making what is known as "table clinics."

Any one having anything new or original that they would like to present there would confer a favor upon the undersigned by communicating with him at once.

Thos. P. Hinman,
Chairman of Clinics, N. D. A.
Atlanta, Ga.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

The thirty-second annual meeting of the New York State Dental Society will be held in Albany, May 9 and 10, 1900, when the following essayists, whose subjects will be announced later, will present interesting and instructive papers.

President's Annual Address. F. LeGrand Ames, D.D.S., Albany, N. Y.

Report of the Committee on Practice. Henry D. Hatch, D.D.S., New York.

Report of the Correspondent. R. Ottolengui, M.D.S., New York.

Papers by F. A. Capon, D.D.S., Toronto; Joseph Head, D.D.S., and Edward C. Kirk, D.D.S., Philadelphia; S. B. Palmer, M.D.S., and Charles H. Barnes, D.D.S., Syracuse; Milton F. Smith, D.D.S., New York.

A cordial invitation is extended to the profession.

F. LeGrand Ames, *President,* Albany.
W. A. White, *Secretary,* Phelps.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held at 563 Tremont street, Boston, Wednesday, March 21, 1900, at 9.30 A.M. Examination in operative dentistry at ten o'clock.

Each candidate must come prepared with rubber dam, gold, and instruments to demonstrate his skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished.

The theoretic examination will include operative dentistry, prosthetic dentistry, crown- and bridge-work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, anesthesia, chemistry, and metallurgy, and will be held at Civil Service Rooms, State House, commencing Thursday, March 22, 9.30.

All applications, together with the fee of twenty dollars, must be filed with the secretary of the board on or before March 14, as no application for this meeting will be received after that date.

Candidates who have taken an examination, and desire to come before the board again at this meeting, must notify the secretary as above in order to be registered.

G. E. MITCHELL, D.D.S., *Secretary,*
25 Merrimack street, Haverhill, Mass.

KENTUCKY STATE DENTAL ASSOCIATION.

THE annual meeting of the Kentucky State Dental Association will be held in Louisville, on the 29th, 30th, and 31st of May, 1900. We are already assured of the best meeting in the history of the association. Aside from an attractive program, the meeting of the National Confederate Association in Louisville at the same time enables us to procure a one cent per mile railroad rate from over the greater portion of the United States. There will be many other attractions to the dentists who attend: trips to the wonderful Mammoth Cave, and to the blue-grass regions of Kentucky.

Ample accommodations at reasonable rates have already been obtained.

F. I. GARDNER, D.D.S., *Secretary,*
213 W. Chestnut street, Louisville, Ky.

ILLINOIS STATE DENTAL SOCIETY.

THE thirty-sixth annual meeting will be held in Springfield May 8 to 11, 1900, inclusive. Drs. E. H. Allen, of the Executive Committee, and J. E. Hinkins, Supervisor of Clinics, promise an excellent program, which will be printed in the April number of this journal.

All reputable dentists are cordially invited to attend.

A. H. PECK, *Secretary,*
92 State street, Chicago.

ALABAMA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners for the state of Alabama will meet in Mobile, Ala., on Monday before the second Tuesday in May, 1900. In addition to the regular written examination, the following requirements will be added, viz:

Each applicant must fill at least two teeth, approximal cavities, one with gold, the other with alloy, work to be done under the immediate supervision of the board. Board to determine or pass on suitable selections of cavities. Boards will try to furnish subjects, but failing to do so, applicants for license must find or bring their own subjects, also instruments and material.

Each applicant must bring a whole upper denture ready for soldering, hard solder required, which work must also be done under the supervision of the board. Applicants must be in Mobile Monday morning.

THOS. P. WHITBY, *Secretary.*

NEBRASKA STATE DENTAL SOCIETY.

THE twenty-fifth annual meeting of the Nebraska State Dental Society will be held in Omaha, May 15-18, 1900.

LEAH MILLS, *Cor. Sec'y.,*
Omaha, Neb.

PENNSYLVANIA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners of the State of Pennsylvania will hold examinations simultaneously in Philadelphia and Pittsburg, May 8, 9, and 10, and in Philadelphia June 19, 20, and 21, 1900. Application for examination must be made to the Hon. James W. Latta, secretary of the Dental Council, Harrisburg, Pa.

G. W. KLUMP, *Secretary,*
Williamsport, Pa.

NORTH CAROLINA STATE DENTAL SOCIETY.

THE North Carolina State Dental Society will hold its twenty-sixth annual meeting in Greensboro, N. C., May 9, 10, and 11, 1900.

The State Examining Board will meet at the same place May 7 and 8. Those who wish to come before the board will please note the date.

J. S. SPURGEON, *Sec'y. N. C. State Dental Society,*
Hillsboro, N. C.

FLORIDA STATE DENTAL SOCIETY.

THE seventeenth annual meeting of the Florida State Dental Society will be held in Jacksonville, on Tuesday, May 1, 1900, continuing in session three days.

H. R. ESTES, *President,* Palatka.
CARROLL H. FRINK, *Secretary,* Fernandina.

IOWA STATE DENTAL SOCIETY.

THE next annual meeting of the Iowa State Dental Society will be held at Dubuque, May 1, 2, 3, and 4, 1900.

I. C. BROWNLIE, *Secretary,*
Ames, Ia.

OKLAHOMA BOARD OF DENTAL EXAMINERS.

THE Oklahoma Board of Dental Examiners will hold their seventh annual meeting at Oklahoma City, May 1, 1900. All applications should be made before the 15th of April.

E. E. KIRKPATRICK, *Secretary,*
Oklahoma City, O. T.

TRI-UNION MEETING.

THE fourth Tri-Union Meeting of the Virginia State Dental Association, Maryland State Dental Association, and the District of Columbia Dental Society will be held at Richmond, Va., May 10, 11, and 12, 1900.

M. F. FINLEY, *Chair. Pub. Com.*

TRI-STATE DENTAL ASSOCIATION.

THE Tri-State Dental Association of Indiana, Kentucky, and Illinois meets at Evansville, Ind., May 8 to 11, 1900.

ELWOOD SMITH, *Pres.,* Mt. Vernon, Ind.
W. H. BROSMAN, *Sec'y.,* Albion, Ill.

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EDITORIAL.

THE OUTLOOK IN ORAL BACTERIOLOGY.

NOTHING in the whole realm of medical study has so profoundly affected its development as the discovery of the pathogenic relationships of bacteria. As the evidence has accumulated connecting these minute cellular organisms with the diseases caused by their activities, the old theories as to the etiology of disease have been discarded and a new pathology, based upon scientific methods of research and observation, has grown into being. The natural result has followed that a corresponding change has taken place in the therapeutics of disease, and the bacterial factor is reckoned with not only in all efforts at combating disease already existing, but also in advance of its attacks by preventive measures, which constitute the basis of modern hygiene and prophylaxis. The impetus thus given to bacterial study has carried it rapidly to a foremost place among the medical sciences, and made it one of the principal departments of biological study. A vast literature has grown up about it; great laboratories with expensive plants of apparatus are devoted to its work, and the keenest scientific minds are engaged in unfolding its details.

While much has been accomplished, the promise of still greater achievements is yet to be fulfilled before all that may fairly be expected of this department of human inquiry has been attained.

The two great generalizations that have thus far been reached and placed beyond the possibility of successful rebuttal are, first, the almost universal existence and distribution of bacterial forms in the human environment, and, second, the disease-producing character of many of them. As the natural consequence of the discovery and promulgation of these far-reaching truths certain hasty deductions have been made; not only by those outside professional lines, but by the superficially informed and illogically constituted within the medical fold,—viz, that all bacteria are disease-producing, and that all diseases are caused by bacteria. Both deductions have been shown to be erroneous. It has been demonstrated that certain bacteria are not only non-pathogenic, but are actually, in an indirect way, essential to animal life; and it has further been conclusively shown that many of the diseases which seriously, even fatally, afflict humanity are dependent for their etiology upon causes quite exclusive of bacterial influence.

The growth of knowledge with regard to bacteriology has made its impress upon dental and oral pathology as deeply as upon all other departments of the healing art. The special investigations which have been carried out upon the bacteria of the oral cavity are among the earliest in point of time and the most important in value among the contributions to the science. The work of Miller in this department is a classic in oral bacteriology, and his followers are gradually broadening the field into which he first blazed a pathway. We may consider the etiology of dental caries, so far as its essential features are concerned, as now placed upon a satisfactory scientific basis. Whatever further developments may take place in regard to the question will be in matters of detail, which will probably not modify to any considerable degree our ideas as to the general nature of the disorder.

The problem which still confronts us, as it has from the beginning, is the prevention and cure of dental caries. The art of dentistry, elaborate and ingenious as it is, has not furnished a satisfactory solution of this perplexing question. The filling of carious cavities in human teeth by the insertion of metallic restorations and various mineral compositions, notwithstanding the consummate skill and artistic perfection with which it may be done, is not the highest therapeutic ideal of which dentistry should be capable. Something more is required of us, and must be attained,—namely, the development of our special knowledge to the point where we can successfully prevent the bacterial destruction of tooth-structure. That is the problem which the science of dentistry must unfold, and the end which it must furnish the means to attain.

It is not to be assumed that such an attainment would dispense with the need for all that dental art has to offer or can bring to bear in a restorative way. Dental caries will probably continue its ravages even when the means for its successful prevention is common knowledge, just as the best efforts of operative dentistry have not apparently diminished the need for artificial dentures; but some portion of humanity would reap the advantages of successful dental prophylaxis, just as an intelligent knowledge and application of hygiene is conservative of a certain portion of the public health.

The expectation that a rational and successful dental prophylaxis will in time be achieved is not new, for it has been expressed as a hope in our literature many times by those whose suggestions are entitled to respectful consideration, and as the study of oral bacteriology progresses the grounds for hopefulness in this regard are increased.

As bearing directly upon the question, the researches of Dr. Black and Dr. Williams upon the structural conditions of the teeth as related to susceptibility to carious invasion are most important. The studies of these investigators show most clearly that faulty structural conditions are but incidental factors in the carious process, modifying possibly its rate or determining the seat of invasion; but that they bear no causal relation to the process, which latter is solely a factor of the tooth environment.

A study of these conclusions reveals their logical soundness, both as related to the subject of their inquiry and in the light of their strict analogy with similar pathological conditions resulting from bacterial invasion of other parts of the body.

With this basis of fact upon which to build regarding the nature of the carious process, we may then ask in what direction are we to look for the means of successfully preventing its invasion? Our efforts thus far have been mainly directed toward removing the bacterial cause by proper hygienic treatment, and the use of those medicinal agents in the form of topical application which are said to have the power of either destroying bacteria or preventing or inhibiting their growth.

But a system of that character is temporizing with the difficulty, and does not squarely meet all the necessities of the case. The essential difficulty is deeper, and cannot be eradicated by such superficial and intermittent means, even though they are at present the best at our command. The real key to the situation is the causes which confer upon the human mouth the quality of immunity to dental caries. Why it is that many mouths are free from any evidence of dental caries has never been satisfactorily answered, yet every dental operator has seen many such, and there are unquestionably many more that the dentist, for obvious reasons, never sees. It is these cases that furnish the proof of an existing natural immunity from the attacks of bacteria of dental caries, and the problem is to discover the cause of this immunity and if possible reproduce it.

The study of susceptibility and immunity as a department of bacteriology is the natural outgrowth of the discovery of the pathogenic relationships of bacteria. This phase of the subject is in its infancy, though enough has been done to indicate that as a means for combating the invasion of living tissue by disease-producing bacteria the use of powerful germicides is faulty, in that these agents destroy the vitality of cellular protoplasm in the tissue, as well as of the bacteria themselves; and a more hopeful field is presented by means which tend to so alter the character of the tissue-cells and juices as to render the ground unsuitable for bacterial development.

Bacteria require for their development more or less rigidly-fixed conditions of environment. Many forms which propagate in an alkaline medium refuse to grow in a medium of acid reaction, and *vice versa;* pathogenic powers may be developed in certain bacteria grown under one set of conditions, and these may, when the conditions of the environment are changed, produce growths which are not disease-producing. Many cannot be cultivated artificially; not because the culture-media are, in a generally accepted sense, germicidal, but because the necessary growth conditions are not supplied, hence the organisms refuse to develop. The researches of recent bacteriologists, notably Nuttall, Behring, Hankin, and Buchner, tend to show that the so-called phagocytic function of the white blood-corpuscle, as pointed out by Metschnikoff, is merely an incident in the destructive effect of these cells upon bacteria, and that their essential germicidal action is dependent upon the elaboration of a germicidal proteid substance, alexin, which is inimical to bacterial life; and, further, that the production of these defensive proteids upon the part of the animal economy is largely related to the general health status; the higher the vital potential, the larger the ratio of defensive proteids in the blood plasma. It is in this direction that we must look for the means of successfully preventing carious invasion of the teeth,—namely, by searching for those means which will so modify the oral secretions as to render them unsuitable media for the development of the bacteria of caries.

It is the pressing character of problems of this nature which broaden the professional horizon of dentistry, and compel an educational equipment of its practitioners which shall enable them to attempt and, let us hope, successfully solve them.

AMENDMENT OF OUR PATENT LAWS.

As will be seen from the following letter, a renewed effort is being made to amend the United States patent laws, so that the patenting of any method or process of treating human diseases shall be prohibited.

Our space limitations prevent a further notice at this time:

To the Editor of the Dental Cosmos:

Sir,—Our bill to amend the patent law, which was not acted upon in the last Congress, has again been introduced by Senator Platt, of New York, in the Senate, where it is known as Senate Bill 269, and also by Congressman McClellan in the House, where it is known as House Bill 7017.

In the present condition of affairs with the International Tooth Crown Company it is more than ever evident that our future protection must come from stamping out the evil at its origin; that is, in the Patent Office, and I urge you in behalf of the New York State Dental Society, whose committee I am, and all the other state dental societies who have supported me, to do what you can editorially and otherwise to aid the passage of this bill.

Thanking you in advance for your courtesy.

Very truly yours,
R. Ottolengui.

New York, February 8, 1900.

INSTITUTE OF DENTAL PEDAGOGICS.

The editor of the *Indiana Dental Journal* calls attention to an error in our designation of the Technic Association, which was rechristened at its last annual meeting, as editorially noted in our previous issue.

Dr. Hunt's letter, here reproduced, is self-explanatory:

To the Editor of the Dental Cosmos:

Sir,—I notice in the February Cosmos that you have a heading for an editorial notice of the "National Institute of Dental Pedagogics." Your editorial speaks of this title as cumbersome, though expressive. As I had the honor of being one of the committee which recommended a new title for the old society, and as there has been some confusion in the various journals regarding the name that was really bestowed on the organization, I desire to state that the title is "Institute of Dental Pedagogics." The word "National" was omitted in order to make the title less cumbersome, and the word "Pedagogics" was used instead of "Pedagogy," the former being the preferable term.

Sincerely yours,
Geo. E. Hunt.

February 13, 1900.

OBITUARY.

DR. WILLIS B. POMEROY.

Died, August 28, 1899, at Cheswold, Del., from paralysis of the heart, Willis B. Pomeroy, D.D.S., of Washington, D. C., in his sixty-third year.

This veteran and distinguished member of the profession was the son of Noah Pomeroy, of Chardon, Ohio, at which place, on July 26, 1837, Willis B. Pomeroy was born. In 1854 the latter became a pupil in dentistry under Dr. Horton, at Cleveland, Ohio. He afterward entered Cincinnati Dental College, from which institution he was graduated in 1858, and the same year he engaged in professional practice in Detroit, Mich.

On the breaking out of the Civil War he volunteered for the Union cause, and served under Pope and Burnside in the Fifth Michigan Volunteer Infantry. In front of Richmond, January 14, 1862, he succeeded to the command of Company G, which he led in the battle of Fair Oaks. At the second battle of Bull Run he was appointed on the staff of General Kearney. On the mustering out of his regiment he served in the Twenty-sixth New York Cavalry.

After Appomattox Dr. Pomeroy established himself in Washington, D. C., where, as the years rolled by, the excellence of his work, combined with his sterling qualities of mind and heart, gained him much distinction socially as well as in the ranks of his profession. He was a member of B. B. French F. A. A. M., and of the Potomac Literary Club, and was chief of staff of the Old Guards of Washington, D. C. Several organizations were represented at the interment in Arlington, when a deserved eulogy of the deceased was pronounced by Rev. B. A. Dumm, of the First Congregational Church.

Dr. Pomeroy married, in 1867, Miss Fanny Gudgin, who survives him. He leaves also three children,—N. Willis Pomeroy, D.D.S., and two married daughters.

DR. JOSEPHUS HOOPER.

Died, December 18, 1899, at Hot Springs, Ark., Josephus Hooper, M.D., D.D.S., from kidney-trouble, in his fifty-third year.

The well-known practitioner of Louisville whose decease is here recorded was born in Spencer county, Ky., in 1847. He began dental practice in Owenton, Ky., in the early seventies, and remained there until 1886, when he removed to Louisville, which was to be his home during the rest of his life. He obtained his dental diploma in 1875, and his M.D. was conferred in 1889. In Louisville he built up a large practice, in which Dr. L. P. Leslie has for some years been his associate. Professionally accomplished, he was highly successful in his business, while his personal qualities made him much beloved by those who knew him.

Until recently he had been considered to be a man in excellent health; kidney-trouble, however, manifested itself, and he grew rapidly worse. It was at the earnest solicitation of friends that he went to Hot Springs to seek relief. For a little while some improvement appeared, but he again began to fail, and the end came soon. A widow and four children survive him.

The remains were shipped to Louisville, the interment taking place at Cave Hill cemetery on December 21.

DR. EDWARD B. HITCHCOCK.

DIED, January 26, 1900, at his home, Newton, Mass., EDWARD BIGELOW HITCHCOCK, M.D., D.M.D., from pulmonary tuberculosis, in his forty-fifth year.

The deceased was the son of the late Hon. David R. Hitchcock, and was born in Newton in 1855. He received his earlier education in the public schools of his native city, and afterward studied at the Phillips Academy, Andover. He received the degree of M.D. at Dartmouth College, and the degree of D.M.D. at Harvard in 1877. He was a member of the Harvard Odontological Society and of the Massachusetts Dental Society, and was prominent in a number of other organizations. The large circle of devoted friends to whom his faithfulness to duty and his professional skill had endeared him will much miss the bright smile that characterized him, and will long remember the exemplary fortitude he displayed during his illness.

Dr. Hitchcock was married in 1885 to Miss Lillie B. Comstock. His wife and one son survive him.

DR. FRANK J. BONNEY.

DIED, December 10, 1899, at Auburn, Me., from typhoid fever, Dr. FRANK J. BONNEY, in his forty-ninth year.

Born in Buckfield, Me., March 8, 1850, he became, when seventeen years of age, a pupil in dentistry with Dr. Gammon, of Buckfield. In 1869 he started upon independent professional practice in Auburn. After having changed his location several times, he finally returned to Auburn, having meanwhile resided at Weymouth and Quincy, Mass., and at Portsmouth, Portland, and Lewiston, Me. On July 1, 1871, he was married, at Auburn, to Miss Nancy Penley, now his widow; one daughter, Ella, also survives him.

Dr. Bonney, while not concerned about pushing himself to the front, was a dentist conscientiously determined that all who gave him their patronage should receive full value in return. All who knew him, moreover, mourn the death of a most genial friend, a man whom it was always a pleasure to meet.

DR. NATHAN PRINDLE WYLLIE.

DIED, January 26, 1900, at Boston, Mass., NATHAN PRINDLE WYLLIE, D.M.D., from carcinoma of the liver, in his thirty-ninth year.

Dr. Wyllie was born in Pittsfield, Mass., January 28, 1861. Since his graduation in dentistry, with the class of 1892, at the Dental School of Harvard University, he has been connected with the teaching staff of that institution, having been for a time assistant demonstrator of operative dentistry, and afterward instructor in materia medica and anesthetics, which chair he filled at the time of his death. He was a member of the Massachusetts Dental Society, and also of the Delta-Sigma-Delta fraternity, in which he was S. J. P. and D. S. G. M.

Dr. Wyllie was unmarried. He leaves a widowed mother.

DR. WM. H. WATERS.

DIED, January 2, 1900, at his home in Burlington, Vt., from organic heart-trouble with gastric and hepatic complications, Dr. WM. H. WATERS, in his sixty-fourth year.

Born in Rutland, Vt., May 2, 1836, Wm. H. Waters there received his early education and was graduated from the Normal School. Having set his mind upon dentistry as a profession he studied at the Baltimore Dental College, and was graduated with the class of 1860. He first practiced in Randolph, Vt., but in December, 1865, he removed to Burlington, with which city he became permanently identified, practicing there during the remaining thirty-four years of his life.

Dr. Waters always took a lively interest in public matters, although he never sought public office. He was a man who made many warm friends, although one who was unhesitating in the expression of very decided convictions. He was a very popular member of the Ethan Allen Club, and for many years was one of the most active members of an engine company.

He was married, June 2, 1862, at Northfield, Vt., to Miss Sarah Fay, of Graysville. His wife died in 1885. Two of their three children died in infancy; their first-born, Wm. Fay Waters, is at the present time engaged in railroad engineering in Mexico.

DR. W. H. H. HINDS.

DIED, from heart-failure, November 20, 1899, at his home, Kennebunkport, Me., Dr. WM. HENRY HARRISON HINDS, in his seventy-ninth year.

Born in Milan, Coos county, N. H., January 20, 1821, the subject of this notice did not take up dentistry until he had had considerable experience in other walks of life. Leaving school at the age of fourteen, he served six years at the carpenter's bench, studying meanwhile, however, architectural and landscape drawing. At twenty-six he entered the New Hampshire militia and was made captain, and three years later became colonel. He was afterward tendered a general's commission, but declined it, not feeling able to support the expense involved. After having carried on the business of architect and builder up to the age of thirty, he then turned his attention to the dental art, in which during the next forty-five years he was an enthusiastic worker; one ever on the watch for improvements, and himself taking some honors in their introduction.

At the time of the war, having helped to raise a company of volunteers, he was chosen first lieutenant. After a military service of a few months he returned home and raised another company, of which he was chosen captain, his company being part of the Thirty-third Massachusetts. Ill health compelled him to resign after the battle of Chancellorsville, and during the rest of his life he was subject to attacks of heart-failure, one of which eventually caused his death.

Dr. Hinds married, first, in Chelsea, Mass., Ellen E. Mooney; secondly, December, 1895, Mrs. Anna Marion Whitney. This lady survives him; he also leaves a son and a daughter by the first wife.

Dr. Hinds was mechanically ingenious, and secured patents for various useful devices; on the literary side his mind was also active, and he furnished many contributions upon various topics to periodicals, occasionally indulging in poetic effusions. He was a Mason of high standing. An uncompromising advocate of temperance, he frequently took the lecture platform in its behalf; he was also much interested in the currency question. The suddenness with which so active a career was terminated accentuates the sense of a great loss sustained by the community.

DR. B. F. HADLEY.

Died, November 16, 1899, at his home, Clarksville, Tenn., **Byron F. Hadley**, D.D.S., in his thirty-fourth year.

Dr. Hadley was a native of Georgia, and was born at Savannah thirty-three years ago. Having selected dentistry as his field, he studied at the Baltimore College of Dental Surgery, and from that institution was graduated with the class of 1894. He then practiced his profession for a time at Nashville, but removed to Clarksville, where he had at the time of his death become a leading and popular citizen. The shocking mode in which death came to him added to the gloom cast over the entire community by his removal, and to the sympathy felt for his thus suddenly widowed partner, who was naturally prostrated by her sorrow. This lady, formerly Miss Mollie Smith, was married to Dr. Hadley two years ago, at Goodnight, Ky. They have no children.

The fatal accident resulted from an attempt to board a moving car. Dr. Hadley fell, and the car passed over his left arm, and also fractured the skull. As he was being borne to his residence he regained consciousness, and anxiously inquired if his wife knew that he was hurt. On reaching home he recognized her, but immediately relapsed into unconsciousness, from which he did not emerge, death taking place in a few hours.

Dr. Hadley, besides being a member of various beneficial orders, was a member and an officer of the Christian Church, Clarksville, where the funeral services were held on November 18.

DR. T. BENTON MOLONEY.

Died, January 17, 1900, at his residence in Norristown, Pa., from heart-failure superinduced by nervous prostration, Dr. T. **Benton Moloney**, in his sixty-fourth year.

Dr. Moloney was born at King-of-Prussia, Pa., in 1836. His grandfather, James Moloney, was a native of Limerick, Ireland, who came to this country in 1796. He had ten children, one of whom, Joshua, married Adeline Magno, a native of France, the daughter of a French jeweler who settled in Philadelphia. Joshua Moloney engaged in farming at King-of-Prussia, and here Benton was born. Three other sons were also born to them, all of whom, including the late Dr. Alvah Moloney, have been dead for several years. Two daughters (sisters of the subject of the present notice) are still living.

Dr. Moloney had been in poor health for nearly a year, the death of his son and assistant, Frank M. Moloney, which occurred last April, having seriously affected him; the loss subsequently of other near relatives added to the nervous depression thus caused, while only a few days before his own death—viz, on January 12—occurred that of his wife's father, Jacob Kramer, of Wilmington, Del. Great sympathy is felt for the bereaved wife in the crushing burden of grief laid upon her by the loss of both husband and father within the space of a few days. Dr. Moloney is also survived by a son, Stuart B. Moloney, who is engaged in business in Philadelphia as an electrician.

DR. WILLIAM A. ROYCE

DIED, at Newburgh, N. Y., April 27, 1899, WILLIAM ATWOOD ROYCE, M.D., D.D.S., in the eighty-sixth year of his age.

Dr. Royce was born at Waterloo, N. Y., April 16, 1814, and was the eldest son of Dr. Roderick Royce, who held a surgeon's commission during the war of 1812, and later practiced medicine for many years at Monticello, N. Y.

He received an academic education at Montgomery, N. Y., and after studying with his father he entered the Medical College at Fairfield, N. Y., in 1834, where he gave considerable attention to dental pathology. On leaving college he began practicing dentistry, somewhat in connection with medicine, at Fishkill on Hudson, but soon relinquished medicine and turned his attention entirely to dentistry. He then placed himself under the tuition of Dr. Eleazar Parmly, of Poughkeepsie, at the termination of which he formed an association in that city with Dr. Esterly, under the firm name of Royce & Esterly.

During this time he conceived the idea of a dental engine, the hand-piece of which was attached to a rawhide arm, and the motive power a hand-lathe fastened on the operating chair. It lacked durability, pliancy, and velocity, and so was abandoned, but it illustrated the desirability and possibility of the dental engine of to-day.

In November, 1848, he opened an office in Newburgh, where he continued to practice until June, 1863, when, through an accident to his eyesight, he was compelled to retire and was succeeded by Dr. Geo. S. Allan, now of New York, who for a year or more had been his assistant. He previously had associated with him in practice his brother, Dr. T. C. Royce, now of Middletown, N. Y., and the late Dr. L. S. Straw.

In March, 1853, the faculty of the Baltimore College of Dental Surgery, in recognition of his professional attainments, conferred upon him the honorary degree of D.D.S., a compliment that he highly esteemed.

Dr. Royce possessed decided inventive ability, and before corundum stones were produced he made a press for the manufacture of emery-stones which were much superior to the old grindstones. He also conceived the idea of using compressed air as a motive power and as a disinfectant. He succeeded in perfecting a pneumatic condenser for which, and for the discovery of a new mechanical force, he secured in 1857 letters patent from the governments of the United States, England, and France.

He was in touch with thouse in the fore ranks of the profession, and ever ready to lend a helping hand to a brother who aspired to rise. He was impatient with the selfish exclusiveness exhibited in the early days of the profession, and did all in his power to elevate his vocation and help along the movement which after many years culminated in procuring a legislative enactment prohibiting the practice of dentistry without a diploma. He is survived by his wife, one daughter, and one son.

DR. CHAS. R. KEARNS.

DIED, January 16, 1900, at Lincoln, Neb., of pulmonary consumption, after an illness of eighteen months, CHARLES R. KEARNS, D.D.S., in his twenty-ninth year.

Dr. Kearns was born November 16, 1871, at Knightstown, Ind. He graduated from the Dental Department of the State University of Iowa in the class of 1893. He began the practice of his profession in Lincoln, Neb., but failing health caused him to abandon it after two years. He was a musician of marked ability and a practitioner of great promise, and the profession of Nebraska feel that they have lost in him a valued ally. His father and three children survive him. C. D.

DR. J. CLARENCE BUSEY.

DIED, November 5, 1899, at the residence of his father-in-law, Baltimore, J. CLARENCE BUSEY, D.D.S., in his thirty-fourth year, after a short illness, death being due to gastritis.

This popular young dentist was the son of the late James R. and Cornelia B. Busey. He was graduated from the Baltimore Dental College in 1890, and he took almost a complete course at the University of Maryland School of Medicine. For nearly ten years he had conducted a successful practice of dentistry in Baltimore. Dr. Busey had a large circle of friends, and will be greatly missed by the young people of the community, with whom he was an especial favorite.

Dr. Busey was married, about three years ago, to Miss Mary Laura Waters, whom he leaves his widow, with twin daughters under two years of age.

DR. WILLIAM H. MARSHALL.

DIED, September 21, 1899, at Little Rock, Ark., WM. H. MARSHALL, D.D.S., from appendicitis, in his fifty-ninth year.

In the death of Dr. Marshall we deplore the removal of one of the most distinguished and most beloved members of our profession in the South. He was the son of Dr. Hammond Marshall, and was born in Pittsburg, Pa., in 1841. Arriving at manhood just as the war broke out, he entered the Confederate service, and served with General Wirt Adams's command throughout the entire period of the war.

In 1867 he entered the office of his father as a pupil in dentistry, and about 1870 began professional practice at Oxford, Miss. Later he availed himself of the Philadelphia Dental College course, graduating in 1880.

Dr. Marshall actively interested himself in the maintenance of a high standard in the profession, and in its general well-being. He was a member of the Southern Dental Association and of the Arkansas State Dental Society, and was also president of the Board of Examiners for each of the two states named.

Dr. Marshall's was a character of true nobility, presenting an admirable combination of strength and gentleness. While achieving in his profession the success to which his fine qualities entitled him, he was a man universally beloved. His life was full of kindly deeds. The death of their parents gave him an opportunity to help the younger members of the family, and of this he fully availed himself. Many young men, moreover, whom he kindly aided in their efforts to fit themselves for the dental profession, will never cease to hold their benefactor in grateful memory.

In 1865 Dr. Marshall married, at Oxford, Miss., Miss Mary McCorkle, whom he leaves his widow. Three children also survive. To the sorely bereaved family are extended the heartfelt condolences of the wide circle of those who share with them the sense of an irreparable loss.

DR. OLIVER KELLS.

Died, October 24, 1899, at Pittsburg, Pa., Dr. Oliver Kells, of Steubenville, Ohio, in his sixty-sixth year, from heart-failure.

Dr. Kells was formerly in practice in East End, Pittsburg, and occupied a prominent position in dental circles. He was paying a visit to that city when he was seized with an attack of heart-trouble which prostrated him, and he was carried to the Homeopathic Hospital from his hotel. Next day he seemed sufficiently restored to make his return home feasible, but suddenly his heart again became affected, and in the course of a few minutes life was found to be extinct. His remains were shipped to Steubenville, where the interment took place.

Dr. Kells leaves a widow, two sons, and two daughters.

DR. J. C. MILLER.

Died, November 9, 1899, at Mechanicsburg, Pa., from apoplexy, Dr. J. C. Miller, in his seventy-sixth year.

This veteran dentist was born in Lancaster county, Pa., October 2, 1824. His connection with dentistry dates from about 1855, when he practiced at Mechanicsburg. On April 11, 1865, he was married, at Harrisburg, Pa., to Miss Priscilla Kister, who is still living. Besides his widow Dr. Miller leaves a son, Jacob V. Miller, and two married daughters.

Dr. Miller was an active and highly valued member of the denomination known as the Church of God, as well as being prominent in civic affairs.

PERISCOPE.

The following article is reproduced here in answer to several requests from our readers, as the subject is one which has recently attracted attention and renewed interest.—Ed. Dental Cosmos.

Case of Elongation of the Under Jaw and Distortion of the Face and Neck, Caused by a Burn, Successfully Treated.—Miss Mary S——, aged twenty, daughter of the Hon. Wm. S——, of Ohio, came to Wheeling in the spring of 1848, to obtain relief from the effects of a very severe burn, which she had received fifteen years before.

The burn was principally confined to the neck and lower part of the face, and its cicatrix produced a deformity of the most dreadful character. Her head was drawn forward and downward—the chin was confined within an inch of the sternum—the under lip was so pulled down that the mucous membrane of the left side came far below the chin—the under jaw was bowed slightly downward, and elongated, particularly its upper portion, which made it project about one inch and three-eighths beyond the upper jaw. In front there was scarcely any appearance of either chin or neck; she was unable to turn her head to either side; the cheeks and upper lip were dragged considerably downward; she could not close her eyelids; she could not close her jaws, but for an instant, and then only by bowing her head forward; she could not retain her saliva for a single instant, and, as might be expected, her articulation was very indistinct.

She had been taken to the city of New York, some years before, for the purpose of being relieved of this deformity, and was placed under the care of two of the most distinguished surgeons in that city, who performed an operation by dissecting up the cicatrix on the neck, then raising the head, and sliding up the cicatrix from its original position, leaving a raw surface below to heal up by granulation. I need scarcely add that the operation was entirely unsuccessful.

After a careful examination of the case, it became evident that such a complicated deformity could be best remedied by performing three separate operations: one upon the jaw; another upon the neck; and a third upon the under lip.

To remove the projection of the under jaw seemed to require the first attention. Unless that could be done, the other operations, however successful, would add but little if any to the personal appearance of the patient. This lengthening of the jaw had taken place entirely between the cuspidatus and first bicuspid tooth of the right side, and between the first and second bicuspids of the left. By this elongation, the teeth just described were separated on both sides about three-fourths of an inch. To saw out the upper edge of these elongated portions of the jaw, and then to divide that part of the jaw in front of the spaces thus made, by sawing it through in a horizontal manner, so as to permit the upper and detached portion to be set back in its proper and original position, appeared to be the only possible way of remedying the deformity. This plan I therefore adopted, and performed the operation on the 12th day of June, in the manner now to be described.

The operation was commenced by sawing out, in a V shape, the elongated portions, together with the first bicuspid on the left side, each section extending about three-fourths of the way through the jaw. I then introduced a bistoury at the lower point of the space from which the section was removed on the right side, and pushed it through the soft parts, close to and in front of the jaw, until it came out at the lower point of the space on the left side. The bistoury was then withdrawn, and a slender saw introduced in the same place, and the upper three-fourths of the jaw, containing the six front teeth, was sawed off on a horizontal line ending at the bottom of the spaces before named (see Fig. 1); the detached portions being still connected, on the outer and inner sides, to the jaw below, by the soft parts. After having, with the bone-nippers, removed from the detached portion the corners which were created by the horizontal and perpendicular cuts of the saw, it was set back so that the edges, from which the V-shaped sections were removed, came together, as represented in Fig. 2.

FIG. 1.

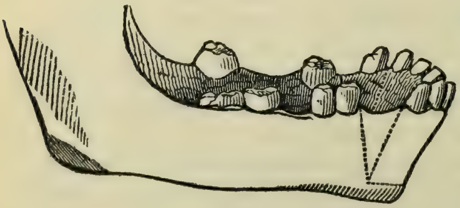
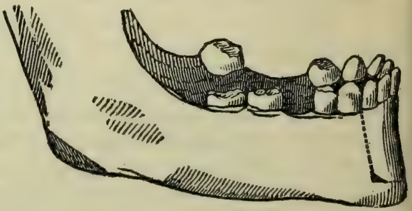


FIG. 2.



Thus it will be perceived that this portion of jaw and teeth, which before projected and inclined outward, now stood back and inclined inward, and in its proper and original place.

In this position the jaw was secured, by passing ligatures around the cuspidati in the detached portion, and the now adjoining bicuspides in the sound portion. Then taking an impression of the jaw in very soft wax, a cast was procured, and a silver plate struck up and fitted over the teeth and gum, in such a manner as to maintain the parts in that same relation, beyond the possibility of movement.

The patient declared that the operation gave her little or no pain. There was a little swelling about the chin during the first three days after the operation, but not the slightest uneasiness. In this way the case progressed; the gum healed in a few days; the jaw united strongly, and in the time bones usually unite; and the wearing of the plate was discontinued within six weeks after the operation was performed. (Fig. 3 represents the manner of closing the jaw before the operation. Fig. 4, after the operation.)

FIG. 3.

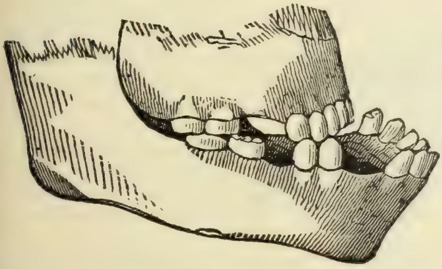
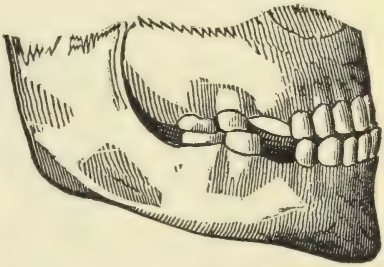


FIG. 4.



The deformity of the jaw being now removed, the next thing to be done was to relieve the confined condition of the head, and the distortion of the face and neck resulting therefrom. This I determined to accomplish, if possible, after the manner of Prof. Mutter in similar cases; and I accordingly performed this operation on the 31st day of July, assisted by Dr. Frissell.

I began by dividing the skin immediately in front of the neck, about half an inch above the sternum—and then carried the incision back about three inches on each side. I then commenced a careful division of the strictures, which were so thickened in front as to extend to the trachea, and on the sides, as not only to involve the platysma-myoides, but a portion of the sterno-cleido-mastoideus muscles also. After dividing everything that interfered with the raising of the head, and the closing of the mouth, so far as the incision was now made, it became evident that, to give free motion to the head, the incision on the neck must be extended back through the remaining cicatrix, which was at least two inches wide on one side, and about an inch and a half on the other; this was accordingly done, the whole presenting a wound upwards of nine inches in length, and nearly five in width. A thin piece of leather was now cut in the shape of the wound, but somewhat larger, and placing it upon the shoulder and arm, immediately over the deltoid muscle, a flap nearly ten inches in length, and five in breadth, having a neck or attachment two inches wide, was marked out and then dissected up as thick as the parts below would permit. This flap was now brought around, and secured in the wound on the neck by the twisted sutures; the sutures were placed about an inch and a half apart; between each of these sutures, one, two, and sometimes three small stitches were inserted, depending entirely upon the number necessary to bring the edges neatly together. These stitches were of fine thread—had a very superficial hold, produced little or no irritation, and served to keep the parts in better apposition than any other means I could have devised. The wound on the shoulder was next drawn together about one-half of its entire extent; the remainder was covered with lint. One long narrow strip of adhesive plaster, applied around the neck to support the flap, and over this a cravat tied in the usual way, constituted all the dressing deemed advisable at this time.

The patient bore this tedious and very painful operation with great fortitude, and without uttering scarce a murmur. She was somewhat exhausted, but not from the loss of blood; there was no vessel divided of sufficient importance to require a ligature.

August 1.—During the fore part of last night the patient was somewhat distressed—was very unmanageable—would talk incessantly, and occasionally sat up in bed. An anodyne was administered at twelve o'clock, after which she rested much better, and slept some. Complains of sickness of the stomach this morning—has vomited three or four times; flap very pale; pulse rather weak. Patient directed to refrain from taking all kinds of drink.

2d. Patient complains of pain only in the shoulder; was much distressed the latter part of last night on account of a retention of urine. The catheter was employed, and about three pints of urine drawn off, after which she rested well. Pulse somewhat excited; flap better color.

3d. The patient rested well last night—the use of the catheter still necessary. All efforts to keep the patient from talking and moving unavailing; color of the flap rather pale, save at the extreme point, and about two inches along the lower edge, which is assuming rather a dark blue color; pulse about the same as yesterday. Removed a pin from near the point of the flap, and enveloped the neck in cotton batting. Patient complains of hunger—chicken broth ordered.

4th. Patient rested well; the use of the catheter still necessary; complains of slight headache; the color of the flap nearly natural, and even the point is assuming a healthy hue, and appears to be uniting; pulse almost natural.

5th. Urinates without difficulty; bowels moved by injection; patient entirely free from pain; pulse natural.

6th. Dressing removed; the flap is uniting by the first intention, along both sides, throughout its entire extent; the greater part of the pins and stitches removed.

7th. The remainder of the pins and stitches removed; patient perfectly comfortable and cheerful.

10th. Sat up all day by the window.

15th. Walked out to take an airing.

During the whole progress of the cure there was not the slightest swelling or undue inflammation in the flap or about the neck. The patient was slightly hysterical the first few days, but never complained of anything except pain on the shoulder, a slight headache of a few hours' duration, and the uneasiness occasioned by the retention of urine. The wound on the shoulder granulated rapidly, and skinned over in about six weeks after the operation. It was curious to observe that upon touching the flap after it had healed in the neck, the patient would always refer the sensation to the shoulder or arm from which the flap was taken.

The confinement of the head and distortion of the face occasioned by the strictures being now removed, the next step was to relieve, as far as possible, a very great deformity of the under lip.

The under lip, from being dragged down and greatly stretched by the former projection of the under jaw, was rendered greatly too large—so much so that it pouted out an inch or more farther than the upper lip. This, together with a turning out of the mucous membrane on the left side, which extended nearly down to the lower edge of the chin, making the lip too short on that side, was the nature of the deformity yet to be relieved.

To relieve this unseemly appearance of the lip, the inverted portion was cut out in a V shape, extending down to the flap in the neck, and sufficiently large to reduce the lip to the proper size. The edges were then brought together and secured after the manner of a single hare-lip. The wound healed in the most beautiful manner—the appearance of the lip was greatly improved, but still there remained a deep depression or notch in the edge, sufficiently large to keep exposed the tops of two or three teeth, besides preventing the coming together of the lips on that side.

I now determined to raise, if possible, this depressed portion of the lip, and for this purpose passed a bistoury through the lip, about two lines from the free edge, first on one side of the depression, and then on the other, and then carried the incisions downward, to meet at a point on the lower edge of the chin as represented in Fig. 5.

The depressed portion of lip now lying between the two incisions was next dissected loose from the jaw, and then raised on a level with the re-

FIG. 5.

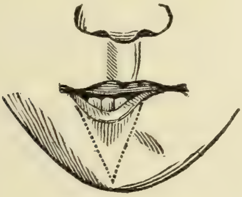


FIG. 6.

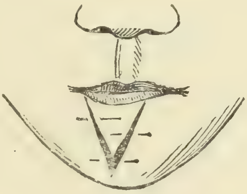


FIG. 7.

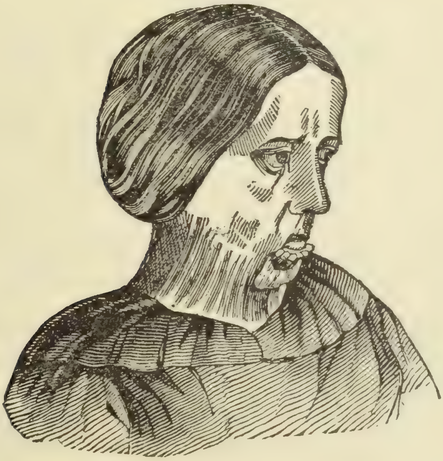
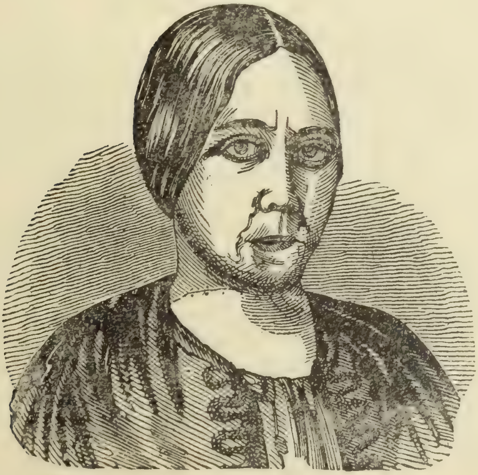


FIG. 8.



mainder of the lip, and there retained by pins, after the manner of dressing a double hare-lip—the line of union forming the letter Y. (See Fig. 6.)

This operation was as successful as the others, and the original deformity being now removed, the young lady, though still carrying evidences of the burn, has the free use of her head, eyelids, jaws, and lips, and may mingle in society without particular note or remark. Fig. 7 represents the patient before either of the operations were performed; Fig. 8, her appearance three weeks after the last operation.)

[The drawings of the first four cuts, accompanying this report, were procured through wax impressions of the mouth, and are therefore exact representations of the position of the teeth, and the manner in which the jaws closed together. The drawings of the last four cuts were taken from daguerreotype likenesses. The daguerreotype process, it is well known, *reverses the sides of the face,* and having neglected to direct the attention of the engraver to this fact, these cuts, though sufficiently faithful to give a very correct idea of the case in all other respects, represent the right for the left side of the face.]—*Dr. S. P. Hullihen, in American Journal of Dental Science, January, 1849.*

HINTS, QUERIES, AND COMMENTS.

CORRECTION.—In making up the pages of the DENTAL COSMOS for January, the accidental omission of a line in Dr. Beebee's paper on "Cements" makes his summary incomplete. The error occurs on page 88, Group 1 being omitted. The passage should read as follows:

The permeability test was the most difficult to determine, as it was to determine the ability of the various materials to resist encroachment of staining agents, and no measurements could be made save that of the eye only.

They were placed for a like period in red ink, removed, washed and dried, and then broken and compared.

I have arranged them in groups, beginning with the least stained:

Group 1. Dawson and Wilcox.
Group 2. Houghton's, Agate, Ames, Caulk's, and Harvard.
Group 3. C. Ash & Son, Artificial Enamel, Lithos.
Group 4. Gilbert's Vitroid, Xenolite.
Group 5. Baldwin's Hydraulic, C. N. Peirce.
Group 6. Welch's, Ivory's, Weston's Insoluble.

TO THE EDITOR OF THE DENTAL COSMOS:

Dear Sir,—I have received a number of letters in regard to my article entitled "Is it Possible to Jump the Bite?" which appeared in the February issue of your magazine. My correspondents request me to explain how it is that I have jumped the bite without disturbing the apparent relation of the three molars shown in Figs. 1 and 4, pages 148, 149. I would be pleased if you would accord me space for a reply.

An examination of the two figures will show that the first lower molar in Fig. 4 is seen to be in antagonism with the second bicuspid of the upper jaw, and a comparison of the two figures will disclose the fact that from this point of view the lower jaw must have been moved forward in order to attain this result. In my models there is a similar difference in the molar region, although in a much less degree, from which is due the fact that the engraver has not noticed this, and has drawn the three molars in both figures in practically identical positions. The chief reason, however, for the apparent discrepancy is due to another cause.

An examination of Fig. 1 will show that there is considerable space between the bicuspid and molar in the upper jaw, which is lessened almost one-half, as seen in Fig. 4. The first molar having been lost, it is manifest that I could not depend upon the second molar for anchorage during the progress of the work, without adopting means to prevent it from being tipped forward. The plate therefore passed between the two teeth at this point, a clasp extending around the distal portion of the bicuspid and another encircling the molar; thus the relation of the bicuspid and molar was kept during the retraction of the upper teeth, and models made immediately after the application of the bite-jumping instrument would have shown this molar in a different position from that which it now occupies.

The retaining fixture, however, which carried the plane, was not constructed to prevent this tooth from moving. (See Fig. 5.) In fact, it was designed to permit this tooth to move forward, and by migration it has done so during the two years which elapsed between the models Fig. 1 and Fig. 4; thus it occupies now very nearly the same relation with its antagonists as it did prior to interference. It was desirable that this space should be lessened as much as possible, affording more room for the eruption of the third molar. And it was practically certain that this would occur, as the attempt to jump the bite at the outset produced malocclusion in the molar region, due to the fact that there had been no widening of the jaw across between the molars. Thus, the present position of this upper molar cannot be used as a basis of argument in the question of jumping the bite.

NEW YORK, February 20, 1900. R. OTTOLENGUI.

THE USE OF PYROZONE, TWENTY-FIVE PER CENT. SOLUTION, AS A COAGULANT.—I wish to bring before my fellow-practitioners, through the DENTAL COSMOS, the value of pyrozone, in twenty-five per cent. solution, as a coagulant. The drug is not new to the profession, having long been accepted for its high qualities as a bleaching agent and mouth-wash; but its power to assist in forming a blood-clot has not been fully appreciated.

I first used pyrozone twenty-five per cent. to allay hemorrhage caused by the extraction of an upper second molar. The patient was sent to me last July by a physician in my neighborhood. She told me the hemorrhage had been very constant from the time of the extraction, early in the afternoon, until I saw her at 8.30 that evening, when it was bleeding most profusely. I syringed the cavity with a saturated solution of alum, and, after packing it with styptic cotton, I applied a wax compress and bandaged the head to keep the plug well in place; bleeding by this time had somewhat abated, but the much desired hemostasia had by no means been accomplished, and in fifteen minutes the hemorrhage had become quite vigorous again. I continued the syringing with alum, but finding that the bleeding was increasing, I decided to remove the compress with the intention of applying the actual cautery. My patient by this time had become very weak and nervous from the loss of blood, and absolutely refused to allow me to use the iron. Fearing a general collapse, I did not insist.

Feeling that pyrozone, owing to its abundance of oxygen in an unstable form, would best answer my purpose, I removed the styptic cotton plug and thoroughly cleansed the cavity by syringing it with lukewarm water (cold water should always be avoided in these cases); then I applied a piece of cotton saturated with a twenty-five per cent. solution of pyrozone, and the result was most gratifying. The rapid oxidation of the blood and surrounding tissue immediately formed the long-looked-for clot, and all further hemorrhage was checked. I packed the cavity left by the extracted tooth with cotton moistened with the pyrozone, twenty-five per cent. solution, and again applied the wax compress. I then syringed the mouth with a diluted three per cent. solution of pyrozone to remove the *débris* caused by oxidation of the blood and tissue. After a careful bandaging of the jaw, so that it held the wax firmly in place, I allowed my patient to recline for half an hour, when, having no further hemorrhage, she was removed to her home. The bandage was removed two days later, and she had no further trouble.

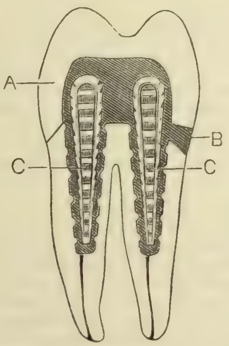
I had not a favorable opportunity of using pyrozone as a coagulant until last week. I have, however, used it on many occasions to prevent hemorrhage during minor operations, for which it is extremely efficient; leaving the tissue clear and clean for further work, and acting at the same time as an effective germicide. The next case of severe hemorrhage after extraction of teeth was in the person of a young miss of fifteen. She had a lower first molar extracted on December 29. After a severe hemorrhage, she tells me a thick clot formed in the cavity left by the extracted tooth, and, except slight pain, she had no trouble with it until the morning of January 4, when, about 1 A.M., a secondary hemorrhage occurred. The family physician was summoned; he made use of various styptics and coagulants, but, obtaining no permanent clot, I was called in about noon. I found my patient extremely depressed; her nerves were in a state of high tension, and she was also somewhat weakened from the loss of blood. In this case, as before, I applied the styptic cotton and the wax compress, not wishing to take any chances with a new treatment. The hemorrhage, after some moments, was apparently checked, and I returned to my office. I was again sent for at five o'clock, the hemorrhage having by this time renewed its former vigor. I then removed the compress, and, after cleaning the cavity, used the pyrozone as heretofore described, with the same satisfactory results. There has not been (up to the time of my writing, January 15) the slightest trace of bleeding from the cavity, which is quite exceptional in such cases. The alveolar process had been sacrificed to a most unnecessary degree, and the surrounding tissue horribly lacerated; in fact, to such an extent had the alveolar process been removed and crumbled that the teeth on either side were quite loose. Fearing that after removing the wax compress, on January 6, mastication might cause the reoccurrence of a hemorrhage, I affixed a gold compress, which was very readily made by fitting a piece of half-round clasp wire to each of the adjoining teeth, and placing between them a flat piece of gold covering the entire cavity. To the under side of this was soldered a loop, extending well down into the cavity which the extracted tooth had left. Around this loop was wrapped cotton moistened with a diluted three per cent. solution of pyrozone. Any other germicide or antiseptic treatment desired may be used. When this is put in place a most effective compression is accomplished without the otherwise necessity of bandaging the head.—H. J. KAUFFER, D.D.S., New York City.

A NEW METHOD OF BANDING THE LOGAN CROWN.—The members of the Denver Dental Association were discussing Logan and Richmond crowns at the meeting of February 9. I suggested a method of banding the Logan crown which I have not seen described or heard mentioned, but which I think is a good one, and one which I give the students of the Dental Department of the University of Denver in my lectures on crowns and bridges. Grind a Logan crown to fit root as usual, make a platinum band to fit the root and to extend above its edge, solder with pure gold, grind the gingival edges of the crown to fit into the band, remove both from the mouth, and cover the junction of crown and band with enamel body, running the body over the labial surface of the band if the band is not entirely concealed by the gum. Place in the furnace and fuse the body. I use Custer's electric oven.—A. H. Ketcham, Denver, Col.

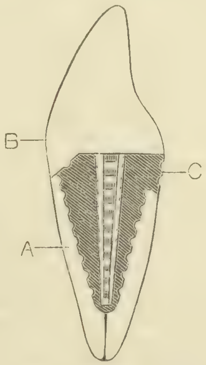
To the Editor of the Dental Cosmos:

Sir,—May I ask if any of your readers can assist me to trace an article from which a recent abstract was made in a medical journal (?), "On a Method and Demonstration for Showing the Lymph-Supply in the Pulp"? Very recently I have seen a paragraph of some thirty lines or so abstracted from the original article, but unfortunately am unable to locate the same. I believe it to be a German article, and within the last six months. Any assistance will be gratefully appreciated.—Inquirer.

To Make an Accurate-Fitting Pin and Root Seal.—Taking for example a root so badly decayed as to leave only a thin edge with enlarged canal, I proceed as follows: The root is supposed to be aseptic and the apical end filled. The edge is ground as smoothly as possible, especially under the gums of the labial portion. The canal is reamed smooth and tapering. A Logan crown is then ground so that it will touch only in front, and the length and occlusion noted. With a sharp knife the pin is barbed and warmed so that a quantity of wax—enough to fill the root and joint between—will stick to it, and then placed in the root and forced to position. Remove, trim, and reinsert until crown touches in front with no wax between this portion of the joint. Take an iron ring about one-half inch deep, with a flat bottom. Fill this with stiff plaster and push the crown pin end down until it touches the bottom, letting the plaster extend upward a little above the wax. Warm and remove. If the wax does not come away, don't scrape it out, as the impression may be scratched, causing projections which will prevent the crown from going to place. Melt out the wax, set the impression over a burner, and fill with some low-fusing metal. When it melts warm the crown; push it down until the surplus metal comes



A, crown; B, metal; C, C, pins.



A, root; B, crown; C, pin.

out around the tooth. Finish and try it in the root. If it fails to go to place, take a piece of wood and coat with vermilion, touching all parts of the canal and end of the root. The spots will show where to scrape off. Cut grooves (not barbs) around the pin, set with cement or gutta-percha. You now have the crown with a pin bearing the whole length of root, with a perfectly tight joint. To construct the crown so as to be able to replace in case of fracture, use a Bonwill or Davis crown. Keep a record of the size and shape, so that if necessity arises the new crown may be simply cemented to place.

For bicuspids or teeth having more than one root, also for separated roots, ream the canals parallel; insert pins that fit snugly, letting them extend three-sixteenths of an inch above roots. Build wax around them; push a gold or hollow crown over the wax; remove and trim. Place the wax with pins in plaster; remove the wax; fill with metal, uniting the pins with metal stump; cement to the root, and crown over the metal.

Touch the pins with zinc chlorid solution to unite the metal.—A. W. Wimmer, Chicago, Ill.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JANUARY, 1900.

Jan. 2.—No. 640,179, to John A. Daly. Process of lining vulcanizable plates.
" " No. 640,551, to Charles A. Fones. Artificial tooth-crown.
" *9.*—No. 640,930, to Martin O. Nelson. Attachment for dental dams.
" " No. 640,947, to Joseph I. Richards. Hot-air syringe.
" " No. 641,006, to Joseph Geddes. Chuck hand-piece.
" " No. 641,170, to Walter J. Thurmond and Edwin W. Clark. Dental appliance.
" *23.*—No. 641,672, to Walter I. Brigham. Dental clamp.
" " No. 641,748, to Robert Brewster. Artificial tooth.
" *30.*—No. 642,114, to Chas. L. Hall. Tooth-brush.
" " No. 642,404, to Basil M. Wilkerson. Head-rest.
" " No. 642,405, to Basil M. Wilkerson. Dental chair.
" " No. 642,536, to Charles C. Southwell. Combined dental engine and chair.
" " No. 32,154, to Wm. E. Harper. Design for handle for dental instruments.

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ORIGINAL COMMUNICATIONS.

RECURRENT (SO-CALLED SECONDARY) DECAY OF THE TEETH, WITH ESPECIAL REFERENCE TO THE ELECTRICAL THEORY.

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WHEN caries makes its appearance in a cavity which has already been excavated and filled, either at the margin of or under the filling, we are accustomed to speak of it as secondary caries. To designate the recurrence of caries in a tooth as secondary caries is, however, no more rational than it would be, for example, to refer to a second attack of the measles as secondary measles, or to the return of a cancer after operation as a secondary cancer.

The term recurrent caries appears to me to express much better the condition referred to, and I shall accordingly make use of this term in the present communication.

It is a very generally accepted view that caries of the teeth is the result of chemico-parasitical influences, modified it may be to a certain extent by forces residing in the teeth themselves. In the year 1867 Bridgman attempted to account for the phenomena of dental caries by a very ingenious theory, now well known as the electrical theory of decay. Stated very briefly, this theory assumes the crown of the tooth to be electro-positive and the root electro-negative; the electric current generated between these two parts produces electrolysis of the fluids of the mouth, setting the acid constituents free on the crown of the tooth, thereby causing its decalcification. Now, while at the present time it would be difficult to find a single author who would engage to defend the electrical theory of caries as referring to primary decay of the teeth, there are some (Palmer, Marshall, DENTAL COSMOS, 1894, p. 893) who still adhere to the view that as soon as a tooth is filled, then, though not before, it comes within the sphere of electric action, a current being produced whose strength (and consequently whose destructive action) depends upon the difference of potential between the filling-material and the tooth.

It is familiar to all that many years ago an electro-chemical series was constructed with gold at the head as the most electro-negative, running down through amalgam, tin, and gutta-percha to oxychlorid of zinc, which finally was put down as electro-positive to dentin. Gold, being at the head of the list, gives the highest potential and the strongest current; it consequently sets free the most acid on the surface of the tooth, and exerts thereby the most deleterious effects. Oxychlorid of zinc has exactly the opposite effect, and protects the tooth from caries. It will also be remembered that Chase (*Correspondenz-Blatt für Zahnärzte,* 1880, p. 190, from *Independent Practitioner*) succeeded in obtaining experimental evidence in support of this hypothesis. Having filled pieces of ivory of equal size and shape with gold, amalgam, tin, gutta-percha, wax, and oxychlorid of zinc respectively, he found that after being exposed to the action of dilute acetic acid for a week they had decreased in weight in the following gradation: 6, 4, 3, 1, 1, 0.

Now, it is neither logical nor does it harmonize with the elementary principles of the science of electricity to discard the Bridgman theory for primary caries and to accept it for recurrent caries. For when we acknowledge that tooth-substance may form one of the poles of an electric cell, then we must recognize the fact that there would also be currents between the different structures of the teeth wherever they are exposed to the action of the fluids of the mouth. We would have currents between the enamel and cement, enamel and dentin, dentin and cement, and the tooth would be destroyed by local currents. Every one knows that if the surface of the zinc (generating) plate of an ordinary element is not homogeneous the zinc will be eaten up by local currents, whether it be connected with the other plate or not. In like manner, if a tooth may form the generating plate of an electric element it also, being far from homogeneous in structure and composition, will be attacked by local currents, whether there is a metal connected with it or not.

Furthermore, some fifteen years ago (DENTAL COSMOS, 1881, p. 91, and *Independent Practitioner,* 1883, p. 86) I pointed out the fact that the hard tissues of the tooth are conductors only in virtue of the liquids which they contain, and that a tooth cannot accordingly form one of the poles of an electric cell any more than a piece of porous earthenware which has become a conductor by imbibing a liquid. I also showed that the results published by Chase were at variance with facts, and that it does not make the slightest difference whether a piece of dentin is filled with gold, gutta-percha, or oxychlorid of zinc, as far as its susceptibility to the action of acids is concerned.

The results which I arrived at have not as yet been refuted, and even Palmer acknowledges their correctness as referring to normally developed dentin. He says (DENTAL COSMOS, 1894, p. 896), "A normal tooth is not an electrolyte; a good filling properly inserted in such a tooth will last forty or fifty years, but a tooth which is in a state which permits mobility of its molecules is an electrolyte. A child's tooth is fifty per cent. organic matter, and is an electrolyte." Dr. Palmer accordingly reduces the sphere of electrical activity to teeth of poor structure, and thereby introduces an arbitrary distinction for which no reason can be found. Where would we have to draw the line between teeth which are electrolytes and those which are not? There is but a slight difference in the amount of lime-salts in teeth of poor and good structure, and we can hardly be expected to believe, simply in order to support a theory, that dentin containing thirty per cent. of organic matter is an electrolyte while that containing twenty-eight per cent. is not. (Enamel would then, of course, be quite out of the question.) The statement that a child's tooth contains fifty per cent. organic matter must, I think, be put down as an error of print. We know that the hard structures of the teeth of children and of adults show nothing like such differences of composition as this statement implies.

It is not quite clear what Dr. Palmer means when he speaks of teeth as electrolytes. Heretofore we have been taught by advocates of the electrical theory of recurrent caries that the filling forms one pole, the tooth the other, and the fluids of the mouth the electrolyte; here we are told that the tooth is the electrolyte, while we know that only substances in a state of solution or in a fluid condition can be electrolytes.

The following statement is still more puzzling: "When gold is malleted upon frail dentin the bruised surface becomes a chemical compound and an electrolyte." Enamel and dentin are both made up of various chemical compounds, as we all very well know. Are we to understand that by malleting gold upon them some new compound is formed? Dr. Palmer also likens malleting gold into a cavity to alloying steel with platinum, a comparison which puzzles me not a little, since it can scarcely be necessary to call attention to the fact that there is not the slightest similarity between these two processes.

Again, "the bruised surface becomes an electrolyte." Can we then convert non-electrolytes into electrolytes by bruising them? In another place Dr. Palmer says that the fluids of the tooth are electrolytes, which no one will deny; but then he says dense teeth are not electrolytes, while soft teeth are. We know of no facts which would justify this assertion, since we have no reason for supposing that the fluids of the tissues differ in different teeth, although their quantity varies slightly; and if they are electrolytes in one tooth they must be in another.

Dr. Palmer further says, "A galvanometer touched to fillings of gold and tin in the mouth will show a galvanic current." But in applying the wire of the galvanometer to the gold filling we of course get a current between the wire and the gold. This has nothing whatever to do with the tooth; much less does it prove that the current was there before the wire was applied. Furthermore, granted the current to be there, Dr. Palmer says that its consequences are not felt in normal teeth, only in teeth with bruised or injured dentin. But this is again not quite logical. The most one would be justified in asserting is that the current would act in different degrees in the two cases.

Let us *suppose* for a moment, with Dr. Palmer, that the *fluids of the teeth* constitute an electrolyte, the hard tissue the positive plate and the gold the negative plate of an electric element; let us furthermore *suppose* that thereby a current is produced which decomposes the electrolyte (that is, the natural juices of the tooth). The caries, which we must also *suppose* to possibly result from such a condition of things, would appear *under* the filling, whereas we know that if a tooth, hard or soft, is thoroughly excavated and approximately perfectly filled with gold the caries never appears under the filling, but at the margins. Again, let us *suppose* that the *fluids of the mouth* constitute the electrolyte, the tooth the positive and the gold the negative plate; we would find in the first place teeth filled with gold decaying much more rapidly than those filled with amalgam, which is in reality not the case, as I shall show farther on.

Again, it is well known that in the ordinary galvanic battery the strength of the current gradually diminishes, owing to the polarization of the plates of the battery. So, too, our infinitesimal tooth-current would very soon become still more infinitesimal or disappear altogether in all places where the plates—*i.e.*, the filling and surrounding tooth-walls—were not kept cleansed and free from accumulations. Only on free surfaces, particularly the grinding-surface, would the plates be kept polished by the action of mastication, and here the electric action would continue indefinitely. The greater initial strength of the current in case of fillings on the approximal surface, resulting from an acid reaction in accumulations of food, would be counterbalanced by the polarization just referred to, and we should expect to find fillings on the grinding-surface failing quite as soon as, perhaps sooner than, those on the approximal surface.

Accordingly, even when we grant, for the sake of argument, the existence of electric currents between tooth-substance and filling, we find that we are not able to account for the phenomena of recurrent caries by them.

Although, as already stated, the accuracy of the results of my experiments, published in 1881 and 1883, has not yet been called in question, I have repeated some of them in modified conditions, and will give the results here.

From ten freshly-extracted teeth the enamel was ground away, exposing the dentin, and a hole bored in each tooth. These holes were filled; half of them with gold, the other half with gutta-percha. The teeth were then all immersed in a physiological salt solution (0.75 per cent. solution of table salt), in order to maintain as nearly as possible the natural condition of moisture of the dentin; those filled with gold and gutta-percha in separate flasks. The solution was renewed from time to time at irregular intervals, varying from two weeks to three months, for a period of four years. Any electric action between the gold and dentin would result in liberating chlorin and hydrogen (hydrochloric acid) on the dentin, which of course would not fail to produce a decalcifying action. After the expiration of four years the margins of the cavities were carefully examined, first with a magnifying glass and then with a sharp excavator, but without revealing a trace of decalcification in any of the teeth. Thereupon a very delicate test was applied in the shape of an aqueous solution of eosin, by means of which we are enabled to detect the least trace of decalcification; but very slightly decalcified tissue staining readily, while the unchanged tissue remains unstained. A small drop of pure hydrochloric acid applied to a surface of dentin and removed immediately by a stream of water will be indicated by a bright red spot at the point of application on staining the dentin with eosin.

Hydrochloric acid in the strength of 1 to 1000 water produces sufficient decalcification of dentin in two minutes to be indicated by staining with eosin; likewise a 0.2 per cent. solution of lactic acid in two and a half hours, and a 0.04 per cent. solution (*i.e.*, 1 to 2500) in twenty-four hours. The action of the juice from a pickled cucumber or from an orange could be detected after five minutes. If, consequently, in the four years during which the experiment was carried on the slightest decalcification had taken place about the margins of the gold-filled cavities, it would have been revealed by the eosin test. Here again the test utterly failed to show any trace of decalcification in or about any of the cavities.

In making these experiments care should be taken not to scratch the walls of the cavity, as the precipitate of the coloring-matter in such scratches might lead an inexperienced experimenter to think that a decalcification had taken place where there was none. These results utterly exclude for me the possibility of an electric current between gold and dentin.

The experiment was then varied by wrapping strips of gold around one end of thin plates of ivory and subjecting them to the action of a dilute (0.06 per cent.) solution of lactic acid. They showed no more decalcification than like pieces of ivory without the gold. In short, in all the experiments which I have made relating to this question, I have never been able in any way or manner to get any sign whatever of galvanic action.

Again, the question may be approached from another direction. The conditions for the production of caries from an electric standpoint are admirably supplied in cases where natural teeth are made use of in plate work, as was formerly often done in Germany. We find in these cases the natural teeth sometimes fixed on bases of rubber, ivory, or walrus with wooden pegs, sometimes with metallic pegs; and sometimes on metallic bases with metallic pegs. Now, a tooth resting on a metallic base ought to form a favorable condition for the production of an electric current, if such were at all possible between tooth-substance and metal; and we would find such teeth melting away more rapidly than those on bases of ivory.

I examined in all eighteen plates, mostly in possession of the Dental Institute of Berlin and in the private collection of Zahnärzt Gosta Hahl. Of these there were eight metallic plates with metallic pins, carrying nineteen teeth, of which four, or twenty-one per cent., were carious; five plates of ivory or walrus with metallic pins, carrying thirty-three teeth, of which twenty-three, or sixty-six per cent., were carious; five plates of ivory or walrus with wooden pegs, carrying twenty-nine teeth, of which eighteen, or sixty-two per cent., were carious, and, finally, two rubber plates with eight teeth on wooden pegs, all (one hundred per cent.) very badly decayed. I found here, as with teeth in their natural sockets, that decay takes place wherever there are retention centers for food. The approximal surfaces nearly always show decay, except where the teeth are so far apart that the interdental spaces remain clean. Bad joints between the tooth and the plate also give rise to decay. Where ivory (or walrus) is used as a base it also undergoes softening and decay at the point of retention, by which the process of decay in the teeth is aggravated.

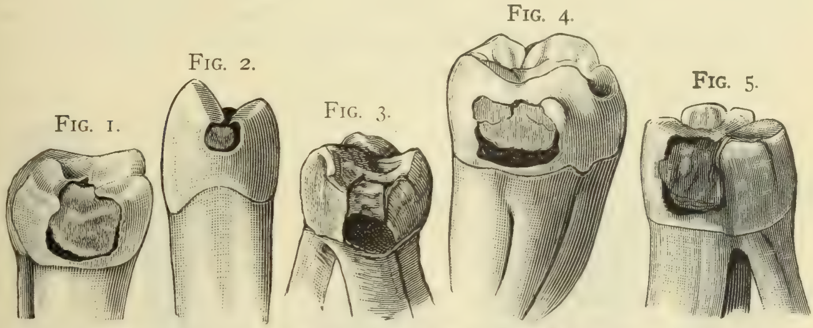
It is of course very natural, and to a certain extent reasonable, to argue that it is not possible to make any deductions from these results without knowing how long each of the plates was worn, and the condition of the mouth in which it was worn. It, however, stands to reason that if electrical activity plays any considerable part in the destruction of tooth-substance in the mouth we ought in eighty-nine teeth to be able to detect some difference in favor of the metallic bases. As a matter of fact, just the opposite condition prevails to that demanded by the electric theory of caries.

Further evidence regarding the electric theory of recurrent caries is obtained by examination of cases of recurrent caries in filled teeth. I have in my collection of extracted teeth one hundred and twenty-five which had been filled with gold, two hundred and twenty-five with amalgam, twenty-two with gutta-percha, and one hundred and thirty-one with cement. Among the teeth filled with amalgam there were a great many where large fillings on the occlusal surface had been undermined by caries of the approximal surface. In making a comparison those cases were left out of consideration. It was then found that on the occlusal surface the gold fillings showed eleven per cent. of recurrent caries, the amalgam twenty per cent.; on the approximal surface gold twenty-eight per cent., amalgam thirty per cent.; in compound fillings gold eighteen per cent., amalgam thirty-four per cent.; in buccal fillings gold twenty-five per cent., amalgam forty-one per cent. The cement fillings showed sixty-six and two-thirds per cent. of recurrent caries on the approximal surface, and thirty-eight per cent. on the occlusal surface.

Dr. Freund and Zahnärzt Hoexbroe, my assistants at the Dental Institute of the University of Berlin, made an examination of eighty-four mouths, containing three hundred and seventy-four amalgam and one hundred and sixty-eight gold fillings, the average age of both categories of fillings being, as near as could be determined, about the same. In the amalgam fillings there were 30.7 per cent. of recurrent caries; in the gold fillings 15.7 per cent. Sixty-seven cement fillings in twenty-six mouths showed fortv per cent. of recurrent caries. These results tally sufficiently well with those obtained from extracted teeth, as noted above.

In Figs. 1-4 I have reproduced a number of typical cases of recurrent caries in cement fillings, from which it will be seen that the points most liable to a recurrence of caries are the same as with gold or amalgam fillings. Only with cement fillings the cavities are larger than we should expect to see with amalgam or gold, owing to a partial disintegration of the filling itself.

No one would think of claiming that these numbers must necessarily be a measure of the comparative liability of fillings of gold, amalgam, and cement to recurrent caries; the number of teeth examined is much too small, and there are too many undetermined factors to permit of any conclusions of this nature. The results are, however, not without significance, and are certainly not what we should have to expect in case electrical action were an important factor in the production of recurrent caries. In this connection the question suggests itself, why is it that we never find caries about metallic bodies,—spear-points, bullets (iron, lead, and copper),— which have been fixed for many years in the living tusk of elephants? The situation of these bodies is often such as would be favorable to electric action.



Figs. 1 to 4 showing caries reappearing around cement fillings, and Fig. 5 around a cement-amalgam filling.

It seems to me that in the above a mass of evidence has been accumulated sufficiently large to show the untenableness of the electric theory of recurrent caries, and I can only emphasize, in concluding this part of my communication, that I have never yet heard any argument or made any observation which, to my mind, furnished any evidence whatever in favor of it.

Knowing the causes of primary caries and the properties of our filling-materials, the causes of recurrent caries become so apparent that we should have no difficulty whatever in finding them out. There is a very commonly accepted view that teeth filled with gutta-percha are not liable to a recurrence of caries, even though the filling may not be watertight. This view is in part right, though it would be going altogether too far to assert that recurrent caries never occurs around fillings of gutta-percha. Various reasons suggest themselves to me for accounting for the comparative rareness of recurrent caries around gutta-percha fillings. In the first place, these fillings do not as a rule remain as long in position as gold and amalgam fillings. In the second place, in case of a perfectly rigid filling, like amalgam or gold, a shock (blow or pressure) is transmitted to the walls of the cavity every time the filling is bitten upon, which shock will be the greater the softer the tissue of the tooth is and the less perfectly the filling is anchored in the dentin and in all parts adapted to the walls of the cavity. The tendency of these repeated blows is to produce disintegration at weak points in the margin of the cavity wherever there may be frail or partially decalcified walls of enamel. This action is absent in fillings of gutta-percha.

In the third place the effect of mastication on gutta-percha fillings, since they are seldom perfectly rigid, is to keep them pressed tightly against the walls of the cavity, especially at the most critical point,—the cervical wall. Here we will usually find the gutta-percha to a certain extent overlapping the cervical margin, and thus protecting it, although it may be injurious to the gum-tissue. These fillings may be even to a certain extent self-repairing, the action of mastication forcing the gutta-percha down upon the margin of the tooth and obliterating the space produced by the recurrence of caries.

FIG. 6.

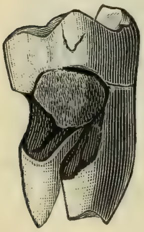


FIG. 7.

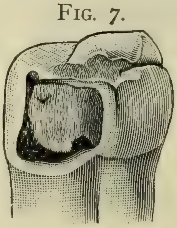


FIG. 8.

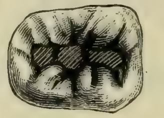


FIG. 9.

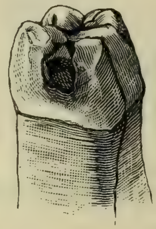
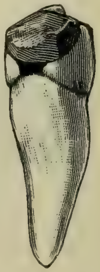


FIG. 10.



Notwithstanding all this, caries does recur around gutta-percha fillings often enough. A right upper second molar which I very carefully filled on the approximal surface with gutta-percha showed extensive recurrent caries on the lingual margin fifteen months later. Also a left upper second bicuspid filled in 1892 with gutta-percha on the distal surface, nowhere exposed to mastication, recently came to my notice showing a large cavity, nearly exposing the pulp, on the cervical margin.

In Fig. 6 we see a large cavity above a filling of pink gutta-percha on the buccal surface of an upper third molar. Here the filling may have been imperfectly adapted in the beginning, and, not being exposed to the pressure of mastication, it does not show any change of form. In Fig. 7 a cavity on the mesial and lingual surfaces of a right lower second molar, filled with hard gutta-percha, shows extensive caries at the cervical margin and extending along the buccal margin. I have a number of such cases in my collection, and my observations have convinced me that the saving qualities of gutta-percha, which have been somewhat overestimated, are not therefore to be explained by any therapeutic virtues contained in the material, or by the absence of galvanic action, but by its physical properties alone.

I have seen preparations of gutta-percha become rigid and brittle in the mouth, in which case the tooth is more liable to a recurrence of caries than when filled with gold or any other material. In fact, such fillings are often simply worthless.

Caries results from the accumulation and retention of particles of food between or in fissures, depressions, etc., upon the free surfaces of the teeth, which places we may call *retention centers*. If, in filling a cavity in a tooth, we do not thereby obliterate the retention center, which primarily gave rise to the decay, there is every reason to suppose that decay may make its reappearance in the course of time. As a matter of fact, the vast majority of fillings do not obliterate the center of retention, whereas, on the contrary, many aggravate it. Either the fissures have not been properly bored out and filled (Fig. 8) or the papilla is partially destroyed by wedging and in finishing the filling, or the latter is not perfectly smooth, particularly on its cervical wall; or its shape is such as to allow particles of food to readily become wedged in between the necks of the teeth, or it undergoes change of form or size subsequent to insertion (Fig. 9), by which the liability to recurrent caries is greatly increased. Again, the union of the filling with the tooth is only a mechanical one, and very often imperfect at that, so that a ready point of attack is furnished along the margins of the cavity.

In proportion to the degree in which these conditions are present will be the liability to recurrence of caries. Only where the cavity is extended to such a degree as to place the margins outside of the center of retention and the material so well adapted as not itself to form a center of retention along its margins, can we reasonably expect the tooth to be less susceptible to caries than it was in the beginning. Operations of this character have, however, other weak points which I shall not discuss here.

The fact that recurrent caries very frequently makes its appearance at the cervical margins of approximal fillings is certainly not difficult to account for. This part of the cavity is usually most inaccessible; the margin is liable to be imperfectly prepared; the enamel is either wanting or so thin that it easily chips away during or after the operation (Fig. 10); the filling is often less thoroughly condensed and finished; the adaptation less perfect than elsewhere.

Another point where recurrent caries frequently makes its appearance is along the lingual or buccal wall of approximal fillings in bicuspids (Fig. 11) and molars. The liability to recurrent caries is here given by allowing frail walls of enamel to stand, and by thus furthermore placing the margin of the filling within the center of retention. The narrowness of the cavity renders it also impossible to properly condense the gold against the margins.

On buccal and labial surfaces we frequently find caries, regardless of the filling-material, occurring, as shown in Fig. 12.

In many of these cases the portion affected by the recurrent caries had already begun to disintegrate before the filling was made. We should, of course, always extend the cavity laterally as far as the enamel shows the slightest trace of decalcification, and even then we do not always remove the possibility of a recurrence of caries, any more than we can prevent the process of erosion from extending around a gold filling.

In small approximal fillings in the incisors, where the space is limited, it is very difficult to obtain a perfect adaptation of the gold to the *labial* wall; accordingly we find recurrent caries frequently making its appearance at this point (Fig. 13). For the same reason we often find these fillings becoming defective toward the cutting-edge sooner than at the cervical wall (Fig. 14). The same applies to very small approximal fillings in the bicuspids and molars. Here it is chiefly a question of imperfect adaptation, and the only remedy is to wedge the teeth or to extend the cavities sufficiently to admit of free access to all the walls.

Gold fillings on the grinding-surface of second and third molars will be found to fail oftenest at the mesial margin. Here, again, it is only a question of the comparative adaptation of the gold, determined by the comparative ease of access. A right-angled hand-plugger or machine mallet enables us to condense the gold as perfectly against the mesial as against the distal wall. In many cases fillings fail or become defective through the breaking away of thin walls or weak corners (Fig. 15),—of course a purely mechanical process; while in amalgam fillings the contraction or change of form of the fillings and the chipping of thin edges of enamel on the margin of the filling, and in cement fillings the gradual wasting away, are very potent factors in rendering the tooth liable to a recurrence of caries.

FIG. 11.

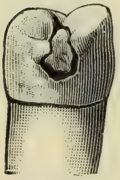


FIG. 12.

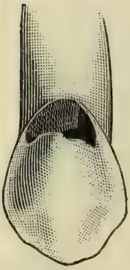


FIG. 13.

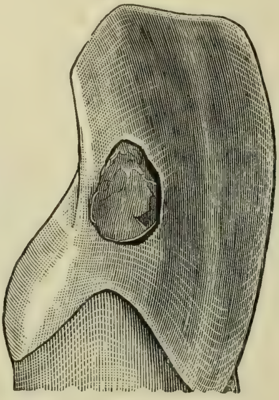


FIG. 14.

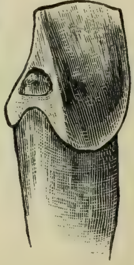
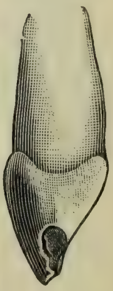


FIG. 15.



To sum up the whole matter, the presence, often in an increased degree, of the causes which primarily brought about the caries, together with points of diminished resistance, resulting partly from the inadaptability, partly from the imperfect manipulation of our filling-materials, or subsequent changes in the fillings themselves, furnish so apparent a solution of the cause of recurrent caries that it is not necessary to bring factors into requisition whose action has never been demonstrated.

MICRO-ORGANISMS IN DENTAL CARIES.

BY KENNETH W. GOADBY, L.D.S. ENG.,

DEMONSTRATOR OF PRACTICAL DENTISTRY, GUY'S HOSPITAL.

(Communicated from the Bacteriological Laboratory, Guy's Hospital.)

(Concluded from page 216.)

THE second division of the subject—*i.e.*, the *liquefying organisms found in dental caries*—is of considerable importance.

"Liquefaction foci" are figured by Miller having various forms, but no direct experiments were made to produce artificial liquefaction.

Vignal, who went a step farther, tested the action of various mouth bacteria, and says of the species he isolated, *"ten dissolved fibrin, and nine dissolved albumin."*

In a recent paper* I gave the result of some digestion experiments conducted with organisms isolated from dental caries, and I have shown conclusively that the fact of an organism liquefying gelatin *is no criterion of its power of liquefying decalcified dentin.*

Since reading that paper I have made some further experiments with liquefying organisms, and am able to confirm the statements made,—*i.e.,* that the organisms which are able to digest dentin are liquefiers of blood-serum, and that, so far as I have tried, those that liquefied ordinary nutrient gelatin only do not affect dentin.

No digestion of uncalcified dentin has so far been effected, the tissue always requiring softening by acids before the digestive enzymes can attack it. In all cases of digestion of dentin the reaction of the medium was distinctly alkaline.

This gives no ground, however, for the supposition recently advanced by Dr. Arkövy, that the process of dental caries might be caused by *non-acid-producing bacteria,* all experiments pointing to the fact that decalcification precedes liquefaction or digestion.

To complete the second division of our inquiry we must therefore note the organisms found in decaying teeth, and which are capable of liquefying blood-serum, which we may take as probable evidence of digestion of dentin from the experiments quoted.

B.—Bacteria in Dental Caries which Liquefy Blood-Serum.

1. B. mesentericus ruber
   " " vulgatus } liquefy blood-serum.
   " " fuscus
2. B. furvus (Goadby) } liquefy blood-serum and dentin.
3. Yellow bacillus (Goadby). Probably B. gingivæ pyogenes of Miller. Pathogenesis not determined (liquefy blood-serum and dentin).
4. B. fluorescens liquefasciens motilis.

Many other organisms are also found which liquefy gelatin but do not affect blood-serum or decalcified dentin.

The "Yellow Bacillus" in the above list is one I have obtained from five cases of caries in mouths which were affected with gingivitis marginalis and in which almost all the teeth were carious.

It appears to coincide with Miller's B. gingivæ pyogenes, as far as one can judge from the slender evidence given by that observer *of the growth in gelatin and agar alone,* without staining reactions, motility, etc., and growth on the usual test media.

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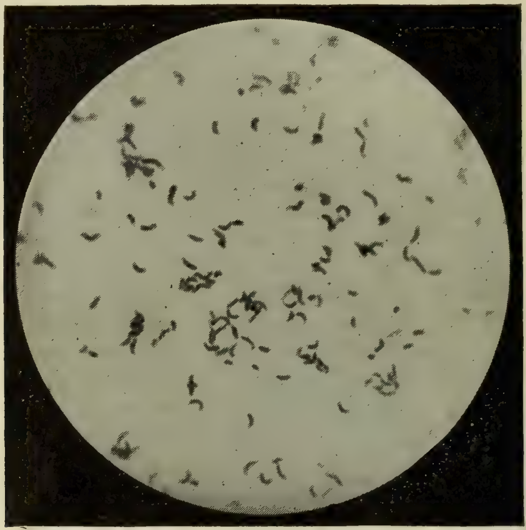
*"Micro-organisms in Dental Caries," Brit. Den. Ass., Ipswich, May, 1899.

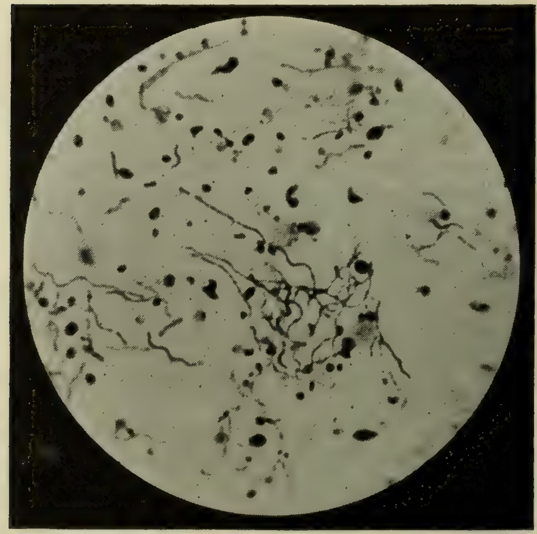
However, to avoid confusion I adopt provisionally Miller's term, and append the proper bacteriological characters.

FIG. 14.



Spirillum sputigenum. Comma form, pure culture. × 1000.

FIG. 15.



Spirillum sputigenum. Spirillum form, showing arthrospores. (Pure culture.)

B. GINGIVÆ PYOGENES.

Found in unhealthy mouths along the gingival margins, in dental caries in such mouths, and in alveolar abscesses.

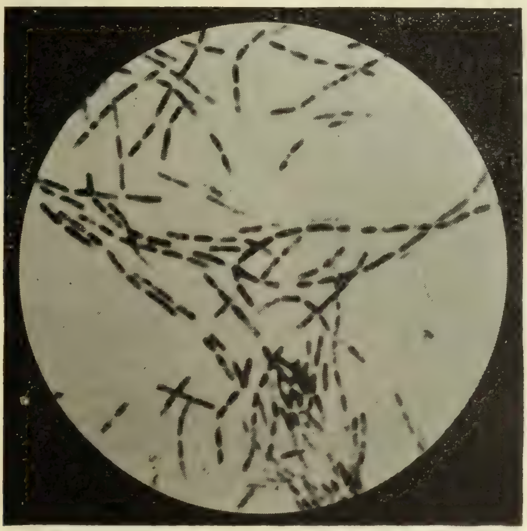
Morphology.—Bacilli from 2 to 6 μ or more long, often jointed in pairs, and at times curved. Ends square or rounded, .5 to .75 μ wide. Two or three bacilli often lie side by side somewhat in the manner of the Klebs-Löffler bacilli.

Involution forms are fairly common on old cultivations, the bacilli becoming swollen or contorted. Stains by Gram's method.

Biological Characters.—An aërobic, facultative anaërobic, motile liquefying, chromogenic bacillus. Forms spores which resist a temperature of 75° C. for half an hour.

Grows in usual culture-media at ordinary temperatures, best at 35° C.

FIG. 16.



B. maximus buccalis. Agar culture. (Gram, 24 hours.)

Growth on Gelatin.—Plates. Forty-eight hours, irregular wavy, feathery edged colony not unlike B. coli, but with yellow center lying above the outer paler collarette of pale gray.

In three to four days the colonies liquefy the gelatin, and float on the surface of liquid gelatin in round, crinkled, disk-shaped masses with thickened center and wrinkled surface, the center being now yellow-brown. The gelatin becomes of a dark brown color.

Gelatin Stab (20° C.).—Forty-eight hours' growth to bottom of stab; three days, slight cup-shaped, liquefied cavity which gradually approaches the sides of the tube. In newly isolated cultures the liquefaction is somewhat slower and the cone may remain empty.

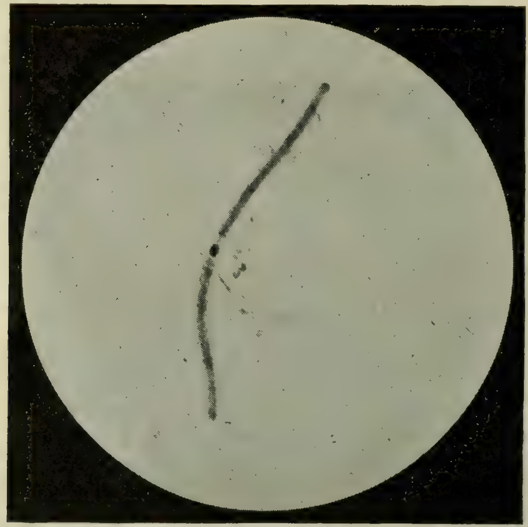
Gelatin Shake (20° C.).—Cloud of minute colonies in forty-eight hours, liquefaction of surface in three days, none in depths.

Gelatin Streak (20° C.).—Forty-eight hours, slight liquefied groove with very little appearance of growth; eventually the liquefied mass becomes full of yellowish-white flocculi, with radiating processes.

Broth (35° C.).—Twenty-four hours, faint growth of dotted flocculi in fluid, no general turbidity. Three days, thick granular precipitate.

Agar (35° C.).—Twenty-four hours, well-defined heavy growth, with tendency to spread at intervals along the streak in club-shaped processes; the central portion of the streak and the clubs is of a buff-yellow, the edges gray-white. In time the agar becomes colored a brownish tint.

FIG. 17.



Bacillus. Mouth direct. ? B. maximus buccalis. × 1000.

Blood-Serum (35° C.).—Twenty-four hours, broad, deep groove of liquefaction, with brown discoloration of medium.

Potato (35° C.).—Twenty-four hours, well-marked dry yellow-brown growth, granular and glistening, the potato becomes colored throughout. The yellow color becomes more marked at a later stage.

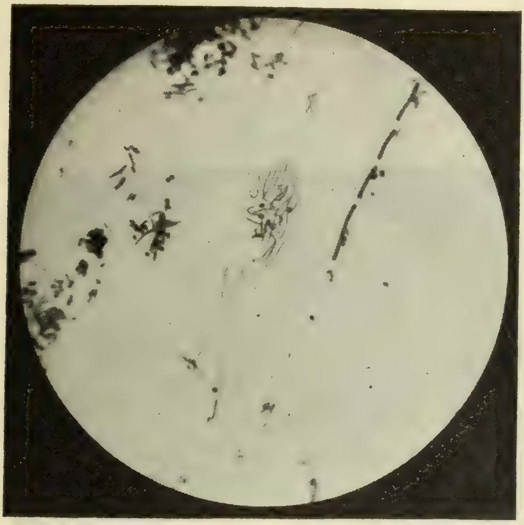
Litmus Milk (35° C.).—Forty-eight hours, well-marked acidity and coagulation of milk; the lower part is decolorized. Eventually the clot becomes redissolved slightly. No gas production and no smell observed.

Pigmentation of dentin is of common occurrence and of many shades, but the discoloration most frequently met with is the ordinary brownish or almost black color assumed in most cases of caries.

B. gangrænæ pulpæ of Arkövy produces a brown discoloration of the medium, even when grown in the hot incubator.

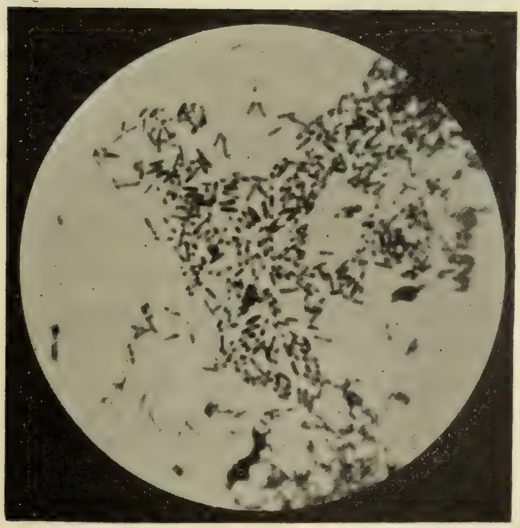
This is important, as most chromogenic organisms produce pigment best at low temperatures when cultivated on artificial media; therefore, in isolating chromogens related to pigmented dentin, the organism in question must be capable of pigmentation in the hot incubator.

FIG. 18.



B. maximus buccalis. Mouth direct. × 1000.

FIG. 19.



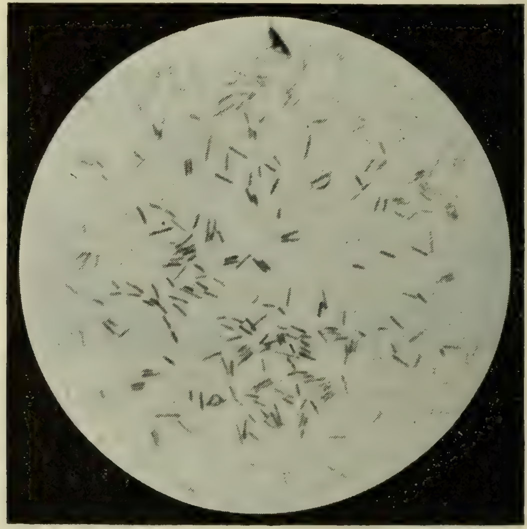
B. furvus (Goadby). 24 hours agar. × 1000.

Miller mentions an organism which produces a brown discoloration of agar, presumably in the hot incubator. No biological facts are given.

Jung has also described an organism (morphology not stated) which produces coloration of the culture-media. It liquefies gelatin rapidly, producing a strongly alkaline reaction.

During my own researches upon the bacteria of the mouth I have met with a considerable number of organisms which color agar (at 35° C.) varying shades of brown, and it is interesting to note that they are in many cases liquefiers of blood-serum.

FIG. 20.



B. mesentericus fuscus. 24 hours agar. × 1000.

The following list places in order of frequency the various bacteria of our third subdivision; some of them are new to me, others have been identified with known species:

C.—Bacteria producing a Brown Discoloration in Dental Caries.

1. B. mesentericus ruber.
   " " vulgatus.
   " " fuscus.
2. B. fuscus (Miller) ? mesentericus fuscus.
3. B. furvus (Goadby).
4. "Yellow bacillus" (? B. ging. pyog. Miller).

Several cocci which also produce brown coloration have been noted, but are awaiting identification, as well as many other species.

There is one other organism which I have found constantly associated with others in dental caries, and in two out of the twenty cases in which the deeper layers were examined and in which B. necrodentalis occurs.

It belongs to a species hitherto undescribed in the mouth; in fact, Miller says, "With the exception of Cladothrix and Beggiatoa, all the most common species of bacteria have their representatives in the mouth."

Zöpf also says he has not found the Cladothrix in the buccal cavity.

Now, the organism I am about to describe appears to belong to the first of the above two groups,—*i.e.*, Cladothricæ.

The Cladothricæ are a curious class of organisms which occur in sewage, and unfortunately commonly in water, especially when there is a putrefaction of any animal or vegetable matter. They are, according to Zöpf, "*Spherical, rod-shaped, filamentous, or spiral forms. The filaments show pseudo-branching; spore formation not known.*"

According to other observers the branching is not pseudo, but actual; and there appears some reason for supposing that both forms actually exist,—*i.e.*, real and pseudo-dichotony. Cladothrix dichotoma certainly shows pseudo-branching. The whole genus has a characteristic in common with Crenothrix, Beggiatoa, and Phragmidothrix, a remarkable pleomorphism, and, as they form threads isolated and branched, cocci and bacilli, unbalanced minds have decided without experiment that the class as a whole is author, progeny, and actuality of all existing organisms; but you will easily see, from what I have said concerning the heads of the so-called Leptothrix racemosa (Crenothrix), bacteria, as stock-keepers say, "breed true," and that when the proper precautions are observed the organisms may be watched through their various stages of development, and that any phase development ultimately undergoes all the typical stages till it returns to the same form again, an insurmountable difficulty to those who suggest that new organisms carefully described are merely phase forms of the Hypomycetes.

A scraping from the enamel of the teeth and examined in the hanging drop generally shows a large variety of threads of many sorts, called by older observers by the inclusive term Leptothrix (*i.e.*, Threads).

Upon staining such a mass by Gram, I have often found a curious branching organism, the branches for the most part being the pseudo-branching of Cladothrix, but when stained the gap between thread and thread is filled up. So far I have only found this organism in twenty mouths, but, as they varied from the pathological hyperemia of gingivitis to the normal mouth of an infant of six, the selection is fairly representative. The organism is often the only one which retains Gram's stain after the decolorization by chloroform and alcohol alternately by the ordinary Gram method (alcohol alone being used, many of the other organisms are stained).

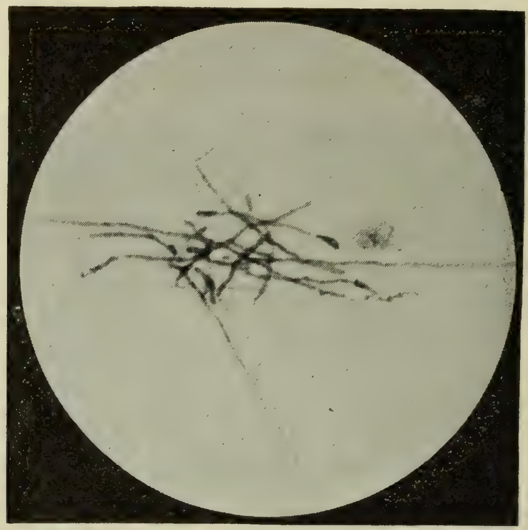
This remarkable organism, whose pleomorphism is unbounded, can be obtained in pure cultivation.

Cladothrix buccalis:—it is as follows:

CLADOTHRIX BUCCALIS (GOADBY).

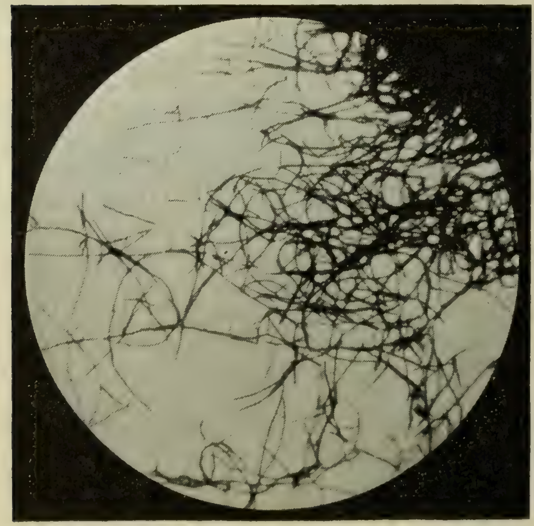
Morphology.—Rod-shaped filamentous forms, with general appearance of branching except in the hanging drop. The threads are somewhat slender, and the ends are often club-shaped. The threads often appear clubbed or, like a streptobacillus, similar to Cladothrix dichotoma (Cohn).

FIG. 21.



Cladothrix buccalis. Mouth direct (Gram). × 1000.

FIG. 22.



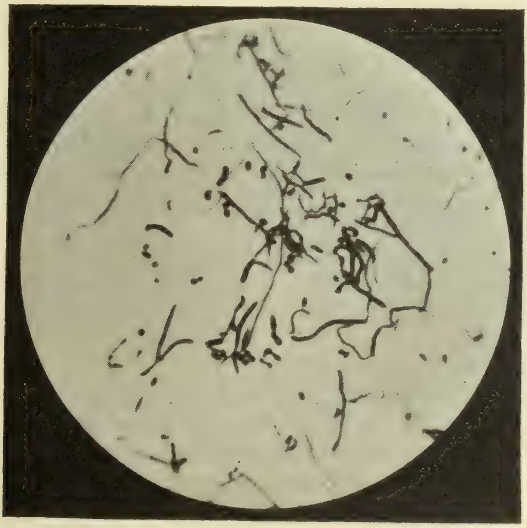
Cladothrix buccalis. 48 hours agar (Gram). × 500.

The branching does not as a rule show such a dichotomous nature as is seen in the other described forms of Cladothricæ, the branches appearing more at right angles to the main stem, especially in agar cultivations markedly clubbed. On potato an unparalleled pleomorphism occurs and all varieties of morphology may be seen, spirilla, threads, bacilli, cocci. The development of the threads from the cocci may be seen. The clubbed ends take the stain deeply.

Staining Reactions.—Stains by Gram and by ordinary anilin dyes; the threads often stain irregularly. The clubs take a deep stain.

Biological Characters.—1. *Agar.* Forty-eight hours, small, hard, raised, transparent, or slightly cloudy colonies about the size of a pin's head; three days, raised, truncated cones, whitish-brown, and in the older colonies a slight crack appears across the top of the cone.

FIG. 23.



Cladothrix buccalis. 8 days potato culture (Gram). × 1000.

The colonies eventually cause a slight depression in the agar.

They are extremely difficult to remove with the platinum needle, and must be removed entire.

The agar is rapidly colored a dirty brown in freshly isolated cultures.

These colonies are extremely characteristic.

2. *Blood-serum.* Similar to agar; no liquefaction takes place.

3. *Potato.* Yellowish or orange-brown, hard, flat layer; the top of the potato is often covered with round chalk-white colonies about the size of small shot; the surface colonies rapidly increase in size, the deep ones remaining the same, and form large raised white hard masses 1 to 3 mm. broad. No brown coloration.

Upon this medium the curious pleomorphism is seen to its greatest advantage, from the preliminary spores to the curious S-shaped spiral forms. The pleomorphism is well seen on reference to the photos, almost all morphological forms being represented; the curved vibrio forms, however, stain by Gram, which at once excludes their being confounded with the spirilla and commas of the mouth, which decolorize by Gram's method. I point this out to avoid the possibility of the supposition that the Cladothrix elements make up the majority of mouth organisms, as Vicentini claims for the Leptothrix racemosa. Much irregularity exists in specimens stained with carbolic methylene blue, especially in potato cultures eight or more days old.

Litmus Milk.—No acid reaction after ten days; a considerable growth of white plaques adheres to the meniscal ring of the fluid. No coagulation occurs. The reaction becomes gradually more and more alkaline.

The organism on this medium at first tends to form large chains of streptobacilli, and but few threads during the first seventy-two hours; subsequently, however, the thread forms develop.

Gelatin.—Stab cultures give little growth; the line of puncture may be marked by a series of the typical disk-like colonies.

Shake Cultures are most instructive, especially if the gelatin be placed in the hot incubator for the first few days and then cooled. Liquefaction of the surface generally occurs after four or five days, but not in all the specimens.

Potato gelatin is generally liquefied.

Broth.—Curious flaky patches form around the edge of the meniscus after five or six days; there is no general turbidity, but a slight precipitate.

No formation of indol takes place.

Spore Formation.—Emulsion of eight-day potato culture in broth heated to 75° C. for half an hour gave no subsequent growth.

No spores were seen in hanging drop or stained by usual methods. True sporulation therefore not present.

RESUMÉ.

In summing up the foregoing remarks we find the questions fall under two divisions:

1. The relation of certain organisms to the destruction of tooth-tissue.
2. The difficulties in separating true species from morphological forms and, I may add, the question of occurrence of the Hypomycetes in the mouth.

To take the latter first.

The fruitful heads and other phenomena of Vicentini's L. racemosa, as observed by myself in the cover-slip plates, agree in many respects with the Crenothrix Kuhnina of Rabenhörst.

1. The morphological variety of its arthrospores.
2. The small transverse sections of J. Leon Williams seem to me to be small zooglea masses, especially as in the broth hanging drops these masses developed thread in the manner described by Rabenhörst and Zopf.*

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*Cohn. Max Schultz's Arch., Bd. 3. Zopf, Spaltpilze, p. 67.

These little tufts of threads are often to be observed in preparations stained direct from the mouth.

Under these circumstances Crenothrix buccalis is a better term than Leptothrix racemosa.

The Cladothrix buccalis (Goadby) which I have described differs in certain respects from Cladothrix dichotoma of Cohn.

As no sulfur grains were observed, the question of Beggiatoa is eliminated. The Phragmidothricæ have, I believe, so far been only found in sea water.

Phragmidothrix multiseptata is not at all unlike the form I have described, owing to the form of the threads and the absence of sulfur grains.

The Cladothrix buccalis has such remarkable pleomorphism in potato and corresponds so closely to Zopf's nomenclature that I think I may leave the matter for the present.

In dental caries a number of organisms have been described which color the culture-medium a deep brown.

I find the potato bacilli, B. mesentericus, ruber, fusca, and vulgata commonly in the mouth; they all three discolor the media.

Arkövy's B. gangrænæ pulpæ produces discoloration, but has a distinct and unpleasant smell like bad cheese; it differs from B. necrodentalis in this respect as well as in the liquefaction of gelatin.

Miller's B. fuscans colors agar brown; no further details given.

Jung.—Organism, coccus or bacillus not stated, but from reactions appears to be Mesentericus vulgatus.

Marten Freund gives three chromogenic organisms, but the pigments differ in many respects from any of the organisms I have isolated.

So far I can find no organism in any way resembling the B. necrodentalis. The liquefying organisms I have isolated appear not to correspond with those described by Vignal, Biondi, and others.

I maintain that in dental caries,—

1. The liquefying organisms are mostly aërobic.
2. The acid-producers are largely anaërobic.
3. That the liquefying of gelatin does not imply digestion of dentin.

And finally, that the demonstration of Cladothrix in the mouth does not imply that the other organisms of the lower class of Schizomycetes are simply phase forms of the higher variety.

CLADOTHRIX BUCCALIS.

1. Mercurial stomatitis.
2. Healthy.
3. Mercurial stomatitis.
4. Muc. memb. healthy, much caries. (No. 13 of caries.)
5. Healthy, many fillings.
6. Gingivitis marginalis, badly-fitting denture.
7. Healthy.
8. Acute general stomatitis (fetid).
9. Gingivitis marginalis.
10. Much caries.
11. Ging. marginalis.
12. Pyr. alveolaris.

Tabulated List of Cases.

No.	Age.	Sex.	Species of Caries, etc.	Site of Culture.	Organisms Isolated.
1. (S.)	25.	F.	Black. $\begin{array}{c\|c} & \\ \hline 4 & \end{array}$	Deep layers.	Strep. brevis. B. necrodentalis.
2. (C.)	21.	M.	Soft. $\begin{array}{c\|c} 6 & \\ \hline & \end{array}$	Deep layers.	"
3. (P.)	32.	F.	Soft and pulp dead. $\begin{array}{c\|c} & 2 \\ & \end{array}$ Alv. abscess.	Deep.	"
4. (B.)	40.	M.	Py. Alv. Soft Caries. $\begin{array}{c\|c} 1 & \\ \hline & \end{array}$	Deep.	"
5. (S₁)	6.	M.	Very soft. $\begin{array}{c\|c} & \\ \hline & 6 \end{array}$	Deep.	"
6. (B.)	36.	F.	Hard. Black. $\begin{array}{c\|c} 6 & \\ \hline & \end{array}$	Deep.	"
7. (B.)	16.	F.	Pulp dead. Soft. $\begin{array}{c\|c} & \\ \hline 5 & \end{array}$	Deep.	"
8. (M.)	60.	F.	Ging. marg. Soft. $\begin{array}{c\|c} & \\ \hline 3 & \end{array}$	Deep.	"
9. (E.)	24.	F.	Healthy Mouth. Hard. $\begin{array}{c\|c} & \\ \hline & 6 \end{array}$	Deep.	Strep. brevis. B. necrodentalis.
10. (L.)	30.	F.	Black. Hard. $\begin{array}{c\|c} & 1 \\ \hline & \end{array}$	Deep.	"
11 (S₂.)	28.	F.	Soft. Yellowish. $\begin{array}{c\|c} & \\ \hline & 6 \end{array}$	Deep.	"
12. (C.)	12.	M.	Soft. $\begin{array}{c\|c} & \\ \hline 6 & \end{array}$	Deep.	"
13. (A.)	5.	M.	Very soft. $\begin{array}{c\|c} & \\ \hline & 2 \end{array}$	Deep.	Strep. brevis. B. necrodentalis.
14. (B.)	7.	M.	Hard. Brown. $\begin{array}{c\|c} & \\ \hline & 6 \end{array}$	Deep.	" Strep. brevis.
15. (S₃.)	43.	M.	Alcoholic dysp. Py. $\begin{array}{c\|c} & 7 \\ \hline & \end{array}$ Very soft.	Deep.	B. necrodentalis.
16. (M.)	7.	M.	Brown. Soft.	Deep.	Strep. brevis. B. necrodentalis.
17. (T.)	19.	F.	Pulp dead. Abscess. $\begin{array}{c\|c} & 5 \\ \hline & \end{array}$	Deep.	"
18. (Sc.)	22.	F.	Pulp dead. $\begin{array}{c\|c} 6 & \\ \hline & \end{array}$	Deep.	"
19. (M.)	18.	F.	Soft. $\begin{array}{c\|c} & \\ \hline & 4 \end{array}$	Deep.	" Strep. brevis.
20. (B.)	39.	F.	Black. Hard. $\begin{array}{c\|c} & \\ \hline & 5 \end{array}$	Deep.	"

Bacteriological Characters of Organisms not Given in Text.

Designation. Bacillus furvus (Goadby).

Source. Found in general buccal cavity, and from carious dentin, fairly common in mouth where caries is endemic.

Description. Short, thickish bacilli with rounded or square ends, 1 to 3 μ long, .5 to .75 μ wide, jointed.

Motility. Extremely motile.

Flagella. Six to ten lateral, very long, four to five times as long as bacilli.

Staining reactions. Stains well by ordinary dyes, but not by Gram's method. With carb. meth. blue and MacConkey's *capsule stain* well-marked polar staining, even in young cultivations. In young cultures the bacilli often take the stain faintly; this is observed in "direct specimens." Upon liquid media streptobacilli are the most common form. Irregular bloated involution forms appear at times.

Growth on broth. Twenty-four hours, well-marked turbidity with flocculi in fluid and deposit. Forty-eight hours, pellicle.

Growth on gelatin stab. Forty-eight hours, small button at site of inoculation. Three days, small funnel, no liq. in depths. Four days, liq. to tube wall.

Growth on gelatin shake. Forty-eight hours, minute scattered colonies. Three days, surface liq., none in depths.

Growth on gelatin streak. Forty-eight hours, well-marked groove of liq., with flocculi in fluid; no pigmentation.

Growth on gelatin plates. Forty-eight hours, minute round white colonies, with slightly depressed area of liq. Four days, plate liquefied.

Growth on agar. Twenty-four hours, small (.5 mm.), flat, gray-white moist colonies, forming gray moist streak, purple tinge in reflected light.

Growth on blood-serum. Twenty-four hours, well-marked groove of liquefaction, dirty brown discoloration of medium, eventually extending throughout.

Growth on potato. Twenty-four hours, well-marked, moist brown, raised growth, brown discoloration of potato.

Growth on litmus milk. Very slight change of color in four days; casein eventually floats to top; reaction generally neutral; may be slightly acid; no reduction of color.

Growth on decalcified dentin. Thin slices of decalcified dentin rapidly liquefied in one to three days.

Anaërobiosis. Aërobic, facultative anaërobic.

Chromogenicity. Brown discoloration of potato and blood-serum; sometimes also agar.

Gas-production. None observed on glucose media.

Acid-production. None.

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Since the above paper was written I have had the opportunity of examining several varieties of Cladothrix, some of them from the mouth and others from water, air, and sewage.

I have several times found the Cladothrix dichotoma of Cohn in the throat while examining a large barrack school during an epidemic of diphtheria. I also found the Cladothrix described in the above paper in some of the throats, and was always able to differentiate it from the other species.

So far I have not obtained the Cladothrix of the mouth from any other source, and I am inclined to think that the most likely source to investigate will be water, but have not at present met with anything like it in waters I have examined.

I have several times obtained the Cladothrix dichotoma from the air. Upon further investigation I find that the Cladothrix I have described produces very little discoloration when grown cold; it does discolor when grown in the hot incubator. This is interesting, as most of the other Cladothricæ do not grow well at 37.5° C., but prefer the lower temperature; it is, however, somewhat difficult to get the mouth Cladothrix to grow at the ordinary room temperature at which most of the others thrive best. I hope to shortly publish the results of these later researches in a more extended form.

K. W. G.

GUY'S HOSPITAL, January 14, 1900.

THE DENTAL EDUCATIONAL PROBLEM.

BY CHARLES S. BUTLER, D.D.S., BUFFALO, N. Y.

(Read before the First District Dental Society of the State of New York, December 12, 1899.)

MR. PRESIDENT AND GENTLEMEN: The subject which underlies all other subjects, and the one therefore to which we should give first consideration, is the system which educates our students and the character of the education they receive. Not until quite recently has it been usual for the profession at large to bestow upon this subject the serious attention it seemingly has deserved, though from an early day much has been written upon dental education. At no previous time, however, has the matter, in so many of its various phases, commanded such wide attention as now, or the whole body of the profession been so awakened to the necessity for better facilities in teaching and a more thorough training of those taking upon themselves the responsibilities of dental practice.

The art of developing the physical, intellectual, and moral faculties of man has occupied the greatest minds in all ages. Writers of every nation and all times have dwelt upon it with a seeming fascination, while Socrates, Plato, Aristotle, and others held it to be the highest privilege of man to assist in training the human intellect.

From the earliest days of our own country—to go no farther back—the importance of education and intellectual development has been recognized and insisted upon, and liberal provision for the advancement of knowledge has been made by the state and nation. Schools in the arts have been established and maintained at government expense, while astronomy, geology, climatology, and their kindred sciences have received substantial encouragement and support from the public treasury.

Not so, however, with the science and practice of medicine. From the days of Hippocrates to the present medical science has fought its own way, developed its own progress, and established its own systems; and this is especially true of our department in that great science, for, "like the spider spinning its web out of its own inwardness," it has developed, unaided and alone, until it stands to-day recognized as one of the foremost professions of the world. It is now just sixty years since a successful effort was made to establish a school for the express purpose of teaching the science and art of dentistry. Its origin and establishment were the outgrowth of a desire on the part of a few resolute, far-seeing men for more knowledge.

The unfitness, the inability of medical schools to furnish the dental student the education which should prepare him for the practice of dentistry was every day becoming more and more apparent.

Entire courses of lectures were delivered in their colleges without the promulgation of a rational theory of the cause, effect, or treatment of a single pathological condition of the teeth. That they were parts of the human organism, complicated in structure and relations, more subject to disease than other organs, in intimate association with the centers of life, important factors in inciting disease in other parts, leading not infrequently to intense suffering and the abridgment of human life, were matters receiving no consideration, and it is now plain of recognition that the great profession of medicine and surgery, while wrestling with intricate and unsolved problems of the human system, failed at the opportune moment to comprehend the importance which attaches to the care and preservation of the teeth, as it utterly refused to make arrangements for their study or provision for the treatment of their diseases, while a request for educational facilities, from those desiring to devote themselves to their preservation, was spurned with contempt as being beneath the dignity of a medical staff. And thus, by force of circumstances, by sheer necessity, independent and separate schools for teaching the science and practice of dentistry were established.

Founded by a few men, with resources limited in every way, our colleges have grown and expanded, and by increase of years and strength have manifested a remarkable advancement by enlarging their curriculum of study, and in every direction affording the opportunity for the impartation and acquisition of knowledge. But institutions of learning, like individuals and nations, are oftentimes compelled to enter upon their careers with limited means; and whatever may have been the aspirations and desires of their founders,—with the fullest possible recognition of all that is demanded for the successful accomplishment of the aims and objects in view,—stern necessity compelled them to accommodate themselves to circumstances and make the most of their resources and opportunities; yet, notwithstanding their limited resources and the inexperience of the founders and promoters of dental educational institutions, for fifty years their progress, though oftentimes slow, was steadily upward. But during the last decade the unusual desire on the part of medical colleges to establish dental departments has thrown into our educational system a series of evils which, if permitted to continue unchecked, must in time threaten the perpetuity of the whole structure, for institutions of learning, like the state and nation, cannot long survive when the object of their existence is base and ignoble.

First and foremost of these evils is that spirit of commercial rivalry which seeks for large classes, making quantity, rather than quality, the standard of fitness, thereby converting into mere commercial enterprises what ought to be educational institutions, and the introduction into the faculties of so many men not dentally educated. Growing out of this condition and present in many of these departments is a tendency toward, and in some instances an actual lowering of the standards of fitness in teachers and pupils alike, and the practice of not over-scrupulous methods in securing students. Promises impossible of fulfillment are not infrequently made, and the waiving of preliminaries demanded by law, the easiest possible methods when applicants for admission fail to meet the required standard.

On the other hand, it is gratifying to record that there has been, and still is, a manifest purpose on the part of others of our schools not only to maintain, but to insist on higher moral and intellectual qualities, selecting their teachers and students from the best obtainable, and persistently dropping out the incompetent and those failing to meet definitely fixed and inflexible standards. In these schools is the hope of dental education of the future, and in the end institutions offering the student the greatest advantages in educational facilities will unquestionably receive, as they will certainly merit, the greatest measure of true prosperity. That the leading minds in the profession are beginning to recognize this is apparent from an address recently delivered by Professor E. T. Darby before the American Academy of Dental Science of Boston, from which I quote his concluding paragraph: "If the dental schools of America are to continue as at present organized, and the curriculum remain the same, it seems to me that a fourth year should be added to the course, and that year devoted almost exclusively to practice in both the operative and mechanical departments. Such additional requirements might deter some from entering upon the study of dentistry, but the profession is not suffering for a large influx. What it needs is better qualified men in its ranks, and the schools which recognize this demand and meet it are the ones which will command the confidence and respect of the dental profession and the world at large." From a paper read before the National Dental Association last August by Professor R. H. Hofheinz I quote the following: "In my estimation we should be in position to judge the physical the same as the mental equipment of the dental student previous to college entrance." These addresses mark a distinct advance in the discussion of this whole question, and no matter how much we may disagree with their authors in the remedies proposed, we must all recognize their long experience and eminent attainments as peculiarly fitting them to speak on any phase of the educational problem. But for myself I believe the day is not far distant when our leading schools at least will themselves establish and require a year in technics as a part of their regular curriculum, to be taken by the student preparatory to matriculation toward a degree, and that only those attaining to a definite proficiency in manual training shall be permitted to enter upon dental studies.

Does it not seem strange that the profession should have been so long in coming to a realization of the needs for a more thorough and systematic mental and physical training of its students before entering upon the study of dentistry? But is it not stranger still that there ever should have been any to insist, as some have done, that the intellectual and physical requirements of dentistry are less than the other professions?

An effort to fix the preliminary requirements for matriculation in our profession at the high school standard in this state has thus far failed utterly, and simply because the representatives of the schools insist that dentistry does not demand as high an intellectual development as medicine, law, veterinary, and pharmacy, and that if insisted upon will necessitate closing their doors,—a most fallacious argument, and one that should receive emphatic condemnation from student and practitioner alike. If the recipient of a dental degree was to deal in abstractions and problems having a moneyed value only, possibly there might be some excuse for such an argument; but to obtain a doctorate degree, entitling its possessor to practice upon humanity, ought to demand and require an intellectual and moral standard equal, if not superior, to any other profession.

Another phase of the dental educational problem to which the profession must needs give greater heed in the near future is the overwhelming preponderance of dental students drawn from unethical surroundings and a sphere in life which does not tend to promote, even if it can allow of, higher standards, for, after all, it is this question of ethical culture and surroundings that is fundamental to all right progress. It not only underlies a moral and gentleman-like development in the student, but necessitates the highest degree of integrity and purpose on the part of those in charge of educational institutions.

In the state of New York the law of 1892 required all dental students to register with the secretary of our state society, and out of the nearly four hundred applying for registration less than twelve per cent. had preceptors members of either the district or state society; and of the graduates of 1899 of one of the schools in this state less than eight per cent. had preceptors holding membership in any organized dental society, a condition unusual perhaps and possibly peculiar to this particular school, yet is it not of sufficient moment to indicate the importance of a more careful selection of the materials out of which dentists are being made? It is not sufficient that these students be required to present evidences of an intellectual development only, nor should their request for educational opportunities and facilities pass unheeded when they are accompanied by ample preliminary qualifications; on the contrary, they should be encouraged and assisted, but in every instance taken out of all unethical surroundings and placed in an atmosphere of the highest moral and professional culture. In this way, and in this way only, may we hope for the elevation of dental standards and the bringing into the profession men properly trained to take upon themselves the practice of dentistry.

During the past ten years the energy and intelligence of the profession has been largely directed along the lines of dental legislation, with a result that there is upon the statute books of every state in the Union, save one, laws regulating its study and practice, and in all this legislation the central idea and purpose is that of repression. That there should have been an apparent need for these restrictive measures is to be regretted, and is a sad commentary upon our educational system, in that it sets forth a want of confidence on the part of the profession in the honesty and purpose of those in control of educational affairs, and the low ethical standards pervading these institutions.

But out of all this legislation it is questionable if there has come that distinct gain to dental education or special increase in the moral and ethical status of the profession that was hoped for. What is needed is not repressive legislation and statutory restrictions over our colleges, but *men,* schooled in the habit and practice of honest and honorable methods, with a sincere desire and purpose that only those richly qualified, morally, intellectually, and dentally, shall be permitted to enter upon the practice of our profession. With all our schools thus equipped the degree of Doctor of Dental Surgery will possess a new meaning, and ought to be received as a license to practice dentistry in every portion of the world.

Speaking broadly, the great problem of education always has been, and still is, to secure in due proportions instruction and the development of the mental faculties. It is this which constitutes the chief difficulty alike in the common education of childhood and the special education of later life. The human mind can be trained only by knowledge imparted to it, and the first effort of all teaching is to so impart facts as to educate the mind in scientific thought that it may be able to found a judgment upon the facts presented.

To accept as true all that established authority says is true, or to fill the mind with such statements by an effort of the memory, is false teaching, since by it the mind may become stored with error instead of truth. To determine that which is true or false and to arrive at just conclusions is of far higher value than mere memory of facts, and should be the primary and ultimate object of all teaching. "And to thus teach," says Dr. Watt, "the instructors should not only be learned in the sciences which they teach, but have skill in the methods of teaching and patience in their presentation." No intelligent man doubts for a moment that one hour's teaching by an expert is worth far more to a pupil than two hours' instruction by a mere routine teacher, or that truths are far more effectively taught by those who have been tempered for their work by the glow that comes from a growing insight into some chosen mental field and who know what devotion to truth for its own sake means. And it is men thus trained and disciplined that are desired as teachers in our profession; not that many of those hitherto and at present connected with our schools are not men of experience, education, and devotion; certainly they are all of these, and are deserving of the highest commendation and respect for what has thus far been accomplished through their efforts and skill. But who of them all is not required to divide his energy and thoughts between his daily practice and his hours of teaching; between a necessity for bread and a desire to impart knowledge? It has been truly said that "no artist, however skillful, who paints his pictures for so much apiece, or is required to paint that he may live, can produce his best results." His must be a labor of love; he must be above financial necessity; his mind and energies must be given without pollution to the study of the true science of his art if he is to exercise and display his greatest genius. And what is true of the artist is equally true of teachers and institutions, and the question may well be asked whether the opening years of the twentieth century shall not witness at least an effort on the part of the profession to provide a school which shall afford the opportunity for uninterrupted investigation and study on the part of its teachers, and which shall be the means of keeping men at their work. And who can estimate the gain not alone to our profession, but to all men, by such an arrangement?

Any system of education which does not keep men constantly at their best work is unbusinesslike and wasteful, and everywhere is felt the loss already sustained in that Miller, Black, Andrews, Williams, and Truman, not to mention scores of others equally meritorious, though perhaps less known workers, have been unable to give themselves wholly to study, investigation, and instruction. And it would seem that the very least a grateful profession can now do is to make provision whereby men of similar devotion and skill may not be required in the future to wear themselves out in a struggle for bread while giving to humanity the results of their scientific labor.

That the agitation for higher ideals and standards in our profession is to become widespread, and in the end successful, I fully believe. That it will receive opposition and discouragement is safe to predict, for there are those who, while perhaps not openly opposed to a forward movement, yet will not accord to it the encouragement and support necessary for its accomplishment. But an institution whose teachers are devoting all their time and energy to study, investigation, and instruction, while not perfect perhaps, would nevertheless have "the promise and potency of success" and be a long step in the direction of higher education and scientific progress.

The dental profession has the making of its own destiny, but that destiny must be wrought out in an independent and dignified course of its own, maintaining separate and distinct institutions of learning, if that *seeming* evil of separation from the mother science sixty years ago is to be overruled for good to suffering humanity and to the credit of general medicine.

PROSTHETIC RESTORATION OF AN AMPUTATED TONGUE.

BY GEORGE B. TERRELL, YONKERS, N. Y.

(Read before the New York Chapter of the Psi Omega Dental Fraternity, January 26, 1900.)

MR. PRESIDENT AND GENTLEMEN: You will excuse the presumption of a student, I think, for appearing before a body of doctors, especially where there are so many leaders of the profession present, to read a paper, when I tell you that it is the request of the members that I give the history of a case of a divided inferior maxilla and amputated tongue for which I made a splint and an artificial tongue while in my junior year at the New York College of Dentistry.

The patient was a man of more than ordinary ability. He could converse in seven or eight different languages, and when his hearers failed to understand him could write it in the same language. He was a college graduate, and also a journalist, so he knew how to appreciate everything that was done for him, and greatly aided the experiments by his patience and faith in their outcome.

As he begins the history himself, he noticed a smarting sensation at the frenum of the tongue, and upon examination discovered a small ulcer, or pimple, as he expressed it. He had been an inveterate smoker, smoking as many as twenty to thirty cigars a day, and immediately upon discovering the pimple he felt a fear of cancer. He applied at a near-by drug store, where the druggist cauterized the pimple with a stick of nitrate of silver. The soreness continuing, the patient applied the caustic himself; and then becoming more alarmed went to the druggist, who directed him to the surgeon of a hospital in St. Paul, Minn. At the hospital a piece of the unhealthy tissue was removed and examined by a microscopist, who diagnosed it as epithelioma. An operation was held out to the patient as the only possible means of saving his life, and he therefore submitted himself to the surgeon's knife.

The operation, which took place about September 15, 1898, was performed by dividing the inferior maxilla at the symphysis, the bones pressed aside, the muscles divided, thereby getting to all of the affected parts, and about two-thirds of the tongue, or to the circumvallate papillæ, cut off, taking out some of the soft tissue under the tongue, making a deep depression between the stump and the lower teeth.

In sectioning the jaw the surgeons cut out the bone the width of the central incisors, taking the teeth away with it. Why this was done I do not know.

After the operation the cut ends of the bone were brought together and fastened with silver wire. The soft tissues healed nicely, but the bones failed to unite. The silver wires, together with the mobility of the severed parts, caused an irritation which developed abscesses, one of which opened under his chin, and the other inside his mouth. The silver wire was then taken out and the jaw left to take care of itself, a fibrous union being the result.

After stopping at the hospital about three months, during which time he subsisted on liquid and softly prepared foods, he came to

New York city with the hope that something might be done for him here. He first went to the New York Hospital, and from there was sent by Dr. Weir to the New York College of Dentistry.

Professor Weisse presented him at the Thursday clinic about the middle of December, 1898. At these clinics volunteers are called for to take the patients and bring their troubles to a happy finish. It came my turn to take this patient, and I made an appointment to take an impression of his jaw. He came at the appointed time, but we did not then take an impression. I never realized before the real use of the tongue as a swab for keeping the buccal cavity clean. In the roof, cheeks, gums, and teeth was a thick deposit of mucus, pus, tobacco stain, and decaying matter such as I had never seen before. In the depression of the floor of his mouth was also this abscess sending out its thick, yellow pus. It took three sittings to get his mouth into even fair condition for taking an impression, and I used plenty of one per cent. solution of formalin while doing it. He had been eating the soft food for the last three months, and no one had even told him to swab out his mouth with a piece of cotton or sponge. The patient told me that he always had a feeling of nausea since the operation, and had fainted several times because of the nasty condition of his mouth, though he had used as mouth-washes creolin, peroxid, and permanganate of potassium. After I cleaned his mouth he continued to improve in health.

Upon examining his jaw I found that the sawed surfaces rocked so that when the mouth was opened the teeth came together in the median line, and when the mouth was shut the teeth were separated as much as three-sixteenths of an inch. I concluded to make a cap splint, as it would allow the mouth to be opened and the abscess treated. I therefore took an impression of his lower jaw in plaster the usual way, and made my splint of block tin. I then took an impression of his chin, made a model of a chin cap or cup, making it as light and airy as possible, and duplicated it in block tin also. I then bent two pieces of round wire, a piece for each corner of the mouth, and fastened by a screw one end of each to the splint, then passing them out at the corners of the mouth bent them down the chin, and then under where the other ends were tapped and threaded to hold a machine screw which impinged against the under side of the chin cup, thus making his jaw fixed as if placed in a vise. The chin cup was lined with lint, and he kept his chin smeared with vaselin to prevent chapping from the saliva which flowed out of his mouth.

The patient declared the apparatus felt very comfortable. The surgeons at the hospital in Long Island City, where he was stopping at this time, were skeptical as to a union taking place, but in seven weeks' time the patient took the splint out and we found a perfect union had taken place. He was subsequently at a medical meeting where he met these surgeons among others who tried his jaw in many ways, but, as he told me, they had nothing to say.

While working on the splint it occurred to me that some kind of an apparatus might be put into his mouth that would at least enable him to eat something beside soft food. He had a continual longing for a piece of meat to chew upon. He could not chew anything, as he had no tongue with which to keep the food between his teeth, and it fell into the depression in front of the stump of tongue, from which it had to be washed out by drinking. I felt quite certain that we could make something that would help him to eat, and while experimenting with him other satisfactory results were developed. The patient was more than willing to be experimented with, though I told him not to expect too much. His jaw had united so nicely, after so many adverse opinions of doctors, that he thought most anything might be accomplished. As a preliminary experiment I simply modeled a piece of modelling compound to fit in the depression between the stump and the teeth, and level with the top of the teeth and dorsum of the tongue. Although it fitted in loosely, the patient could talk a little better with it. I then pictured in my mind about the kind of an apparatus I would make, and, though I first tried several other experiments, I came back to the original idea. I will tell you some of the ways I tried first, as failures are sometimes instructive, and once having been tried no time should ever be lost on them again.

I first got a model of the lower jaw and teeth in zinc, then I swaged a piece of German silver to fit around the inside of the teeth from the last molar on one side to the last molar on the other, reaching from the gingival margins to the cutting-edges of the teeth, and bending over several little lugs to fit in the sulci of the morsal edges to prevent the rim from cutting down into the gums. I then soldered a gold clasp on each last molar and the first bicuspid on the right side, and then a round platinoid wire across the heel of the rim from molar to molar. I then swaged another piece to fit inside of the first piece, and, holding them together, bored and tapped them to hold small screws. Then I spread a piece of rubber dam over this frame, tucking the edges between the two rims, the screws holding it all in place. Then a little trigger was made to swing on the round wire in the back, the back part of which was beveled under to fit against the stump of tongue, and a long piece to project out under the rubber dam, the purpose being that, the rubber forming a floor for the mouth, the stump of tongue in moving would push the beveled end of the trigger, which would swing on the wire and pushing up the long end against the rubber would cause it to bag up and throw the food between the teeth, where the buccinator muscles would take care of it on the other side. This arrangement did not prove satisfactory, as the food packed up on the rubber; the rubber was offensive, and there was a feeling to the patient of something wanting.

In my next experiment I took the trigger and rubber dam out and filled in the whole frame from the tongue to the teeth in front with modelling compound, flattening it toward the back, but rounding it up in the middle with sloping side toward the morsal edges of the teeth. The object was that the food might continually slide in between the teeth while being chewed upon, but this is what it did not do. The food packed between the mound and the roof of the mouth, and the voice was very much muffled.

My next and last experiment was to take the outer rim which I had swaged, and, as it was very irregular on account of its following the lines of the teeth, I tacked against it with solder a strip of thin platinum plate, making a perpendicular walled box on the inside. I then filled in between these two pieces with solder, making a rim of solid metal with the top edge even with the top of the teeth. I now modeled out of modelling compound a tongue to fit inside this walled rim with a thin flange projecting from the tongue and resting all around the top edge of the rim, making it nearly flat on top, and toward the back making a gully as a sort of director for grinding the food into the esophagus. The back end of the tongue was made thick and beveled under, so as to fit the stump. The compound was molded around the wire in the back, so that any movement of the stump imparted motion to the artificial tongue, causing the end to tip up. After getting the proper shape of a tongue in modelling compound, I duplicated it in block tin, which I found to be too heavy. It was so heavy that it tired the patient's stump of tongue. I then made one of red vulcanite, weighting it near the thick back end. The last thing was to attach two molars to the rim on the right side to replace two of his own that had been lost, and the artificial tongue was completed.

The motions of the muscles against the tongue kept it in motion, causing a constant agitation of the food, and throwing it back into the esophagus. The buccinator muscle of course prevented the food from lodging between the cheeks and teeth, and as an eating-machine it proved very satisfactory. I can very well remember his pleasure at having eaten his first piece of meat.

While talking the tongue bobbed up and down, and it certainly made his enunciation much plainer; and though I wished it might be better, he felt quite satisfied, and said he did not feel dressed without it, and he never cared to talk to strangers without his tongue in place.

When he first put in the completed tongue and saw it jump up and down he laughed till the tears came. It certainly made him feel happier.

Last, but not least, was the comfortable feeling it gave to his mouth. He said to me, "You have no idea the rest it gives to my mouth; it seems to fill a void left by the amputation. If for no other reason, I would wear it in my mouth for that."

The patient was intending to have one made in gold and red vulcanite after the pattern of the one just experimented with, and upon which I intended to improve a little in fastening the tongue to the frame, and some other minor things, but the recurrence of cancer showed itself in enlarged glands of the neck, and he underwent an operation from which, I am sorry to say, he did not long survive. He died December 18, 1899, at St. Joseph's Hospital.

After all, it was but a mechanical arrangement, and no machine that can ever be devised can do more than a small part of what our own God-given tongue can do. We cannot fully appreciate its value to us.

A PLEA FOR THE INTERPROXIMAL SPACE.

BY A. C. SEARL, D.D.S., OWATONNA, MINN.

(Read before the G. V. Black Club, St. Paul, Minn.)

MR. PRESIDENT AND GENTLEMEN: It is not without some timidity and many misgivings as to my ability to interest and to lead your thoughts to profit that I offer this matter for your consideration. In every book we read, some chapters will be less interesting than others; each day's experience has its less impressive features, yet we must accept them as a whole,—the poor with the good,—knowing that, however feeble the effort, some one may reap a little benefit.

I desire to disclaim any intention of coming to you with any discovery of my own, for there are others who are far more able and better versed in the practice than myself. I offer for your consideration a few thoughts that I have gleaned on the interproximal space.

The teeth as they stand in an unbroken arch have their normal points of contact near their occlusal surfaces. The points of contact of the incisors and cuspids are in line with their cutting-edge, while those of the molars and bicuspids are at the buccal third or in line with the buccal cusp. The natural contact of the teeth forms a succession of strong V-shaped spaces overhanging and protecting a delicate gum-septum. The contact of one tooth with another forms two other V-shaped spaces, one opening to the lingual and the other to the buccal. These are the buccal and lingual embrasures.

The teeth are all a little broader in a mesio-distal direction, at or near their occluding surfaces, than at their necks; and their approximal surfaces touch in such a way as to leave the V-shaped openings between their necks which are filled with this gum-septum. One of the first evidences of decay in the teeth is the lodgment and pressure of food upon this gum-septum in the interproximal space, and if allowed to continue it will in time change the arched form of the gum to more the shape of a pocket for the lodgment and retention of food. The results of the continued impaction of food into the interproximal space, you all know, are recurrent decay, gingivitis, and pyorrhea.

The interproximal space has been destroyed in some cases so completely that there is no soft tissue between the approximal surfaces farther than the gingival line, and even at the gingival portion of the roots a trace only of the peridental membrane remains. When the contour of a tooth has been lost from decay or the points of approximal contact have been flattened by wear, the normal width of the space must be restored to protect the gingival septum from any unnatural pressure and the approximal surfaces of adjacent teeth from decay.

It is not only necessary to regain the interproximal space, but we must maintain it. Where the teeth have become worn by contact until they have broad facets with the space obliterated, attended with the retention of food, although there be no decay, we are warranted in separating, forming cavities, and making fillings in those teeth to restore the interproximal space.

The average width of the space is about two and one-half millimeters, the narrowest being between the incisors and cuspids, the widest between the molars, and the intermediate between the bicuspids. These spaces differ materially in different dentures; in bell-crowned teeth they are much wider than in thick-necked teeth, and narrower in teeth that project. I find plenty of literature on the contouring of the teeth, and I can find but a single reference to the contouring of the interproximal space. We must not be deceived by thinking that if we contour the tooth we have also contoured the interproximal space, for it does not necessarily follow. We are often obliged to plus contour the tooth to get our point of contact and thus protect the gum-septum, or it may be necessary to bring our contact point nearer the occlusal surface than normal in short-crowned teeth.

Can we not best subserve the interests of our patients by contouring the interproximal spaces rather than contouring the teeth? In our crown-work we have the best opportunities for the formation of self-cleansing interproximal surfaces, and may we not do this even at the expense of the masticating surfaces? It is our duty to our patients to restore and retain the interproximal space in as healthy a condition as possible.

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PROCEEDINGS OF SOCIETIES.

INSTITUTE OF DENTAL PEDAGOGICS.

The seventh annual meeting of the National School of Dental Technics convened at the Continental Hotel, Philadelphia, on Wednesday, December 27, 1899.

The meeting was called to order at 10.45 A.M. by the president, Dr. N. S. Hoff. On motion, the minutes of the previous meeting were approved without reading.

The Executive Committee reported as follows through its chairman, Dr. George H. Wilson:

Dr. Wilson. The report of the Executive Committee must consist in simply presenting the program, which you have all received. Otherwise we have nothing to report. I wish especially to give credit to our president and the other members of the Executive Board and the local Committee of Arrangements for the assistance rendered in getting up this program. The amount of work on it is due to them alone.

I wish also to express my regret at some little feeling that has arisen in some of the schools because of what was considered a slight. This is entirely due to the chairman, and I assure you that nothing was intended in that line whatever. It was more an oversight and lack of judgment, nothing in the way of lack of heart in the matter.

I also desire to call attention to the fact that we sent out two hundred and forty-four of the programs with the circular letters, and endeavored to send them to every school in the country, members and non-members of the association. It was thought that was only what was right to do, because this is a national school of dental technical work. We are not a close corporation, and for that reason we certainly desire the schools who are not members to know what we have if we have anything good. The schools who are not members of the Association of Dental Faculties are not eligible at this time, but we see no reason why they should not come, and we have taken the liberty of inviting them.

Report accepted.

The President. I would state that the gentlemen who are to report on prosthetic dentistry and operative technic desire a slight change in the order of the program, and desire that the president's address should precede them, rather than as it is printed, for the reason that they are not quite prepared with their reports. With that modification we will accept the report and approve the program.

Dr. H. P. Carlton was then called to preside while the president read his annual address, as follows:

Gentlemen of the National School of Dental Technics: Following the precedent of my predecessor in office, and at the invitation of your Program Committee, I beg your indulgence while I try in a brief way to direct your attention to some particular functions of this organization, which, it seems to me, should be carefully considered at this meeting or in the very near future, in order that we may successfully meet the demands made upon us and the expectations and hopes of our enthusiastic supporters.

It seems to me that the one demanding our first consideration is that to which my predecessor so ably directed your attention one year ago, and upon which you did not at that time feel prepared to act. I refer to the advisability of changing the name of the organization so that it would include the larger conceptions we now have of our work. I do this not because I am not satisfied with the presentation made by my predecessor, but because I believe we are now more in accord with the idea and better prepared to consider it. When the present name for this organization was adopted it was suggested by gentlemen who were full of enthusiasm, because they had found a systematic and satisfactory method of presenting the subject of operative dentistry from the purely technical standpoint to their classes. And, believing others would be interested in the same system and would be helpful in its future development, they conceived the idea of organizing a class or school of instruction.

Prosthetic technics was added later, and the name, National School of Dental Technics, seemed to be not only appropriate, but entirely adequate. But as time passed, and the value of the several meetings held began to appear in the great advance made, and because of the stimulus started by the discussions had and the exhibition of actual results obtained in work accomplished by the students, teachers in other subjects of the dental curriculum became interested, and asked that their work might also be recognized and admitted for consideration; until at this time there is a persistent demand that the scope of our organization be enlarged, and possibly its name changed so as to admit at least all the specially correlate subjects of a practical or technical character, if not the entire dental curriculum. This subject was considered of so much importance last year that your president's address at the last meeting called especial attention to it, and suggested it as a very proper subject for consideration.

The idea has met with some opposition, largely from those who fear that the past usefulness of the organization in developing and maintaining interest in the purely technical subjects may be impaired or obscured by long discussions of a purely pedagogical nature on subjects which, while important as fundamentals, are generally taught by science teachers having no particular knowledge of dental technics.

This objection, it seems to us, has no considerable justification, because of the fact that none of these subjects have ever been considered or offered for discussion in our meetings; neither have the teachers in these departments manifested any considerable interest in our meetings. It is very possible that we should be largely advantaged by having such teachers—many of whom are specially educated for their occupations, and devote their entire lives to teaching—discuss their particular problems in our meetings. And we might well afford to give them the time necessary to gain that which shall enable us not only to impart technical knowledge, but to instill correct intellectual habits with our instruction. In the excellent address of Professor C. M. Wright at our meeting one year ago he made this statement, which is well worth considering in this connection, "Every one who has been placed in the position of a teacher has thought much about methods, but definite notions are rare." Is it not true that the large majority of our technic teachers have taken up the work without any special preparation, and hold their positions as a result of mere accident?

Does it necessarily follow that because a man has made a success in the practice of his profession, he is therefore qualified to administer the affairs of an institution organized to educate professional men? Or because a man can make a beautiful and artistic filling that he is the man to instruct others in the same art? Is it not too true that many of our teaching faculties are organized on these standards?

And men are put into positions as teachers or leaders of thought and action who, while abundantly able to execute and probably to think satisfactorily for their own necessities, yet come far short of measuring up to their opportunities from a pedagogical standpoint. As Dr. Wright suggests, such teachers must think much as to methods and try many costly experiments, and only arrive at definite notions after long experience. Would it not therefore be of the greatest value to us, mostly teachers by accident, to have the benefit of the counsel and experience of those who, because of their education and experience, ought to be qualified to be helpful in broadening our outlook and giving us a larger conception of our duty?

I am not pleading for less of the purely technical, nor for the pedagogical exclusively, but, for reasons implied if not expressed, I fear we shall not be able to sustain the present interest nor accomplish our purpose unless we are willing to take a broader view of the subject. I feel confident that we should take a conservative action in declaring at once our purpose and desire to discuss fully not only the purely technical subjects of our curriculum, but also such as have an indirect relation to what are called the "practical chairs." Fortunately we are to test this idea, to some extent at least, in the present session. Your Executive Committee has given us this year a program which I am sure will develop this thought more vividly than I can hope to do in calling your attention to it here briefly.

If we are to admit other subjects than the technic of operative and prosthetic dentistry, we should, to some extent at least, define the object of the association, so that in the future the limits of our field may not be questioned. Some still believe that the place for pedagogical discussions should be in the meetings of the National Association of Dental Faculties, and claim that this organization must always be looked upon as a section of that body and subject to its decisions in all questions involving changes in methods of imparting instruction; others express the hope that the time will soon come when the National Association of Dental Faculties will take up the work now done by this organization with more effectiveness, because it will be able to command obedience to any conclusions reached, while this organization has no power to enforce its edicts.

We are of the opinion, and many others we know hold the same, that from all present indications there is no hope that the National Association of Dental Faculties will very soon, if ever, be in a position to calmly and thoroughly take up the subject of methods of teaching with the hope of any definite results. The time of the National Association of Dental Faculties is fully taken up with executive affairs of very little interest to teachers from the pedagogical standpoint, but of great value in a general educational way to our profession. And the sessions of that organization are so frequently the scenes of so great mental agitation as to render impracticable an unprejudiced discussion of anything so tame as a method of imparting instruction. Is there any one who was present at the recent meeting of the National Association of Dental Faculties who would be so rash as to venture the opinion that a pedagogical subject could have received adequate treatment in that meeting?

We are fully convinced by the interest manifested in the last two meetings of this organization that it has a mission, and is filling a place heretofore unoccupied in the work of dental education. And while many things of pedagogical interest must be given over to the National Association of Dental Faculties for final sanction, such as preliminary requirements, length of course, subjects taught, when taught, etc., the actual teaching work and the best ways of doing it must come through some distinctively organized body, such as the present National School of Dental Technics. This organization has not power to enforce its edicts; it should not in any case make laws, neither does it. It may influence legislation by educating its members or by creating a sentiment which shall result in wise legislation, but its time should never be taken up with legislation or with the discussion of purely legislative topics. We may increase the standard for entrance by demonstrating the necessity; we may lengthen the college course by showing the need.

We may likewise secure a scientifically graded or uniform course of study by discussing the time and place in our curriculum where a student will pursue certain studies to the best advantage. If we are to accomplish so much it must be apparent to every one that we cannot narrow our scheme to the two practical branches only, and in their technical aspects. We must, in fact we are bound to, take in the whole curriculum, and every subject contained in it should be a proper one to bring before this body.

If we are then to broaden our scope of work, it seems that it will be highly proper and necessary to change the name of our organization so that it will express the objects we have in view. At the previous meeting the name "School of Technology" was suggested in place of "School of Technics," which is certainly more in harmony with our present ideas. We would further suggest, as we are not a national organization,—having at least one member from another country,—that we substitute "American" in place of "national." And since we do not meet in the capacity of a school, which term pertains largely to the primary departments of education, while we all profess to be masters, and especially since we do not, in any usual acceptation of the term, conduct a school with a master and pupils, but our proceedings are more in the nature of a convention, that the term "institute" would more accurately define our organization; and since we meet to discuss or consider the science that treats of the facts and principles of our art, the term "technology" is amply expressive.

Therefore we suggest that the name of our organization be changed to that of the "American Institute (or Convention) of Dental Technologists." Such a name would be comprehensive and dignified. It sufficiently localizes the organization, and defines its purpose in terms that can be appreciated the world over. It permits of unlimited expansion, and yet is distinctively inclusive. An experience of three years in providing programs for discussions by this organization justifies me in urging that you take up this matter at this meeting and settle definitely the policy and sphere of action for this organization, so far as may be done constitutionally.

My predecessor in office last year suggested this change as a possibility, and I most earnestly recommend it as a necessity at this time, if we are to obtain the greatest usefulness from it and continue the wonderful interest of the last two meetings and the promising success of the present one.

Another matter which it seems to me demands early consideration is the curriculum of study in our dental schools. I am fully aware of the fact that I am broaching a subject for endless discussion possibly, and one which may belong to another organization. My conviction, however, is that no organization is so well calculated to adjust this problem satisfactorily as this one, for the reason that it will never be satisfactorily adjusted except on purely pedagogical principles and practices. It should be discussed entirely from that viewpoint. If our profession has any justification in its classification as an art or science, it must be built upon principles. If so, what are they, and how shall we best illustrate them to such as may be seeking knowledge of them? It is necessary that a dentist should know more than the anatomy of the teeth or their immediate environment, or more physiology than will enable him to artificially supply dental organs lost accidentally or by disease. Or more chemistry than will enable him to bleach a stained tooth. Is it not possible that we are spending entirely too much time studying anatomy, physiology, chemistry, bacteriology, general pathology and surgery, at the expense of the more important technical details? Do we devote so much of our time to the study of purely medical sciences as to seriously interfere with the development of such technical skill as is demanded by our art in the practice of our profession?

I shall not attempt to discuss these questions here, or at least now, but I bring them before you because I believe they are not only pertinent subjects at this time, but that they are fundamental, and should be considered before we proceed to consider the best methods of presenting them to our classes. Let us determine if we can whether we need them at all, and, if so, to what extent. Then we shall be ready to give them their proportionate time and place in the curriculum, and be prepared to forever silence the teacher who assumes to say that the dental student does not need this or that; also the indolent student who is forever wanting to know of what use this or that particular study will be to him when he gets into the practice of his profession.

There is here a large field for discussion and plenty of room for difference of opinion, and it may seem like a problem of too many unknown quantities to give us any hope for satisfactory solution. It seems to me, however, that it is a matter of the greatest importance, and we cannot escape its consideration if we dare hope to put our educational system on a uniform and scientific basis.

It is a large and formidable problem, but none too large or formidable for the wisdom, courage, and fraternal spirit which has and does characterize the membership of this body. And I commend it for such early consideration at the hands of our Program Committee as may seem expedient.

Another matter which it seems to me would add interest to the proceedings of this body is that our meetings should be held in such places where are located schools having unusual opportunities in the way of teachers of recognized abilities, buildings well planned and equipped for imparting instruction, or other advantages which might be utilized by the less favored schools. And that a systematic visitation and inspection of not only the buildings and equipment be made a special order of the program, but that such schools be put on the program, and that their methods of management and of imparting instruction be as fully demonstrated as is practicable.

This has not been done before by this body because it was thought that the meeting should be held entirely distinct from any college, to avoid any unpleasant jealousies which are apt to manifest themselves where there are two or more schools located in the same city. It may be that such a course was advisable when this organization was younger and contained representatives from only a few of the schools, but since it has become strong enough to take care of itself, and contains most of the schools in its membership, it does seem as though it had earned the right to be independent and take some risk for the sake of benefiting its constituents as much as possible.

As an illustration, it was thought by some of the members of the Executive Board that it would be very desirable to set apart some of the time allotted to this meeting for visiting the schools in this city; this being one of the oldest and best-known educational centers in the United States, and containing three of the oldest and most creditable schools, each having an excellent building and equipment, and the members of their faculties are well known and thought of the world over.

Could we not well afford the time necessary to make a reasonable inspection of the facilities at least which these institutions possess, and also an idea how they are utilized? There are many things in connection with the school in which I teach that I am always glad to show any one interested in teaching this line of work, and I know that every other teacher has the same feeling and experience.

I am very sure there are some particulars in which each of the schools of this city are doing better and more thorough work than is being done by the rest of us, and it would be well if we could see their facilities and learn of their methods. At least it would give us a chance to compare notes, and would be the means of generating a spirit of emulation which could not be otherwise than helpful in results.

In conclusion, allow me to commend to you for your thoughtful consideration these items to which I have directed your attention, believing that in each lie possibilities for still further advancing the usefulness of this organization, and through it the elevation to a higher plane of our system of dental education.

Dr. Carlton. You have heard the president's address. The discussion will be opened by Dr. E. C. Kirk, to be followed by Dr. H. A. Smith, after which the discussion will be general.

Dr. Kirk. Mr. Chairman and members of the association: The address to which we have just listened is so thoroughly in accord with my own views upon the subject that it is quite difficult to discuss it. Certainly there has been little said that is open for criticism. The suggestion that the association change its name to harmonize more definitely with its avowed purpose is one which should meet with cordial and sympathetic approval and reception.

As I take it, we are not here for the purpose of studying new methods of performing technical operations in operative and prosthetic dentistry alone, but we are here avowedly for the purpose of studying better methods of teaching technical operations to students. The fundamental idea of the association is a pedagogical one. We are here that we may better educate ourselves as teachers and as demonstrators. At the beginning we confined ourselves to one or two branches of the curriculum. It seems to me we should extend beyond that idea, that we should study teaching methods in all the branches of the curriculum. There is a necessity for this expansion. What dentistry needs to-day more than anything else is properly trained and educated teachers. It is quite true, and I think there can be no difference of opinion as to the point raised by the president,—viz, that the simple ability to do technical operations or to perform any of the requirements of our calling does not in itself constitute a man a teacher. A teacher is something else. He must have the ability to convey the idea and understanding, the skill and power to perform these operations, to another individual. I am in hearty accord with the idea that we should extend the study of teaching methods to all subjects in the dental curriculum.

With regard to the proposed change of name, I am not able to see that the suggestion which our president makes as to calling us technologists differs essentially or etymologically from our present designation. If we are merely studying technics we are technologists. I would include what I deem to be the fundamental idea of the association—namely, the pedagogical idea—in its designation. That we are here as pedagogues of dentistry, which includes teaching as an art as well as a science in the elements of our profession. That is a matter which it seems to me is so important that it should be referred to a committee to take into consideration and report at this meeting.

I would raise a question as to the word "practical" in designating the faculty chairs. That has been one of the stumbling-blocks in the way of preparing a satisfactory curriculum, and if in using the word practical it is indicated that we are teaching some subjects that are not practical, I must take exception to it. I do not know that the president meant to imply that, but if there is anything that is more practical than a knowledge of anatomy, physiology, bacteriology, chemistry, and so on, I should like to know about it. It seems to me they are the most practical things we have to deal with. Certainly no practitioner who meets properly the demands of his patients will deny that a proper knowledge of these fundamental branches is essential, and therefore most valuable. Besides having the ability to go into a laboratory and make a tooth, there is the other scientific side of knowing the principles involved in doing it. We should not create confusion by calling one side of it practical and the other, by implication, impractical and theoretical. Even theory is a practical thing; one of the most practical things we can deal with. For a common example, when certain atmospheric conditions are present, when it is cloudy and the atmosphere is loaded with moisture, we have a theory that it will rain, and we practically make use of that theory in taking an umbrella as a protection, and so I think the word "theory" should not be used in such a confusing sense.

With regard to the National Association of Dental Faculties, it seems to me practically impossible, as the president has said, for the National Association of Dental Faculties to fully deal with these pedagogical questions. Its time is taken up with questions of administration and legislative questions, which exclude the broad consideration of these subjects; but, as a matter of fact, the membership of this association is largely the same as that of the National Association of Dental Faculties, so that what we do here could be legitimized by them if thought desirable. If we express an opinion and come to an agreement affecting the matter of a curriculum it could be legitimized by the National Association of Dental Faculties, for, consisting largely of the same membership, the two bodies would work harmoniously. It is important that this society should concern itself largely with the study of teaching methods, and leave the legitimizing or legalizing of the result to the body which is constituted for that purpose.

With regard to the subject of uniformity of curriculum, I would call attention to the fact that we may overdo the unification idea. It would be perfectly possible to unify the curriculum so that the work in each school should be the exact counterpart of the other, but it is illogical to attempt to create a body of dental practitioners as the product of such an educational system in the same way that the government creates soldiers, a lot of men cast in the same mold, all of the same type, and who work as automatons. There must be the element of individuality in all of the dental schools. There is a process of natural selection going on by which I think these minor differences in the curricula will largely adjust themselves. I do not wish to be understood as taking exception to the idea of a reasonable degree of unification, but let us not go so far as to crush out the individuality of the separate schools or the practitioners who are their product.

The next idea to which my attention was drawn was the question of the overbalancing of the dental curriculum on the one side as against the other. There may be a possible tendency to give too much time and study to the theoretical side of anatomy, pathology, and so on, to the disadvantage of the technic of the work. I think we are at present facing a very serious danger in that regard. I believe the solution of that difficulty should be found not in reducing in any degree the amount of time or attention that is given to this so-called theoretical or scientific side, but by an increase in the length of time devoted to the whole curriculum. I think any man who looks at this subject from an unprejudiced point of view will admit that there is no study either in the technical or theoretical side that we can dispense with. It seems to me that if dentistry is to occupy the position it should rightly assume and achieve the dignities we claim for it, we must take a position on a level with the other specialties of the healing art. I don't think we can afford to curtail any one of the branches. We must look this fact fairly and squarely in the face; that it does take and will take at least four years to properly equip a man for the intelligent practice of dentistry. It is true, as it is true of other medical and scientific specialties, that four years is none too ample for the work.

With regard to the final suggestion, that of the association visiting schools, the idea is an intensely practical one, and one which bears directly upon our work here. It is an education in itself. I came into this room and saw one exhibit, the first exhibit that was installed here, and I felt I was fully repaid for any effort I might have taken to come here. In following the suggestion of the president that we visit these institutions, we ought to be able to pick up ideas that would be of very great use to us..

Dr. H. A. Smith. I can only recommend the paper as being very able, and as covering the whole ground very fully. I feel as though I can say very little after the able discussion of our friend Dr. Kirk. If you will observe the trend of the address, you will notice that it is following in the same line as the suggestions made by the president last year. Dr. Hoff, our president, in the exuberance of his youth has gone a little further, and suggests certain changes which Professor Black suggested. I made a few remarks in reference to the suggestions of Dr. Black last year, and I have no especial reason to change what I thought was proper for the society to adopt at that time. I claimed at that time that to extend the scope or purposes of this organization would be a usurpation of the purposes of the Faculties Association, and I still think so.

Dr. Hoff refers to the meeting of the Faculties Association last year. I sat by Dr. Hoff on one or two occasions, and I noticed that his eyebrows were drawn down, and that he was pretty thoroughly disgusted with some of the things there. After that meeting adjourned we thought or reasoned this way about it: If we can change the methods of the Faculties Association so that the time will not all be consumed in useless wrangling, that this was the proper body to discuss methods of teaching and curriculum, and all that, but after a little lapse of time I have come to the conclusion that perhaps we had better keep within the definite lines of the purposes of this organization for a while, and give that body a chance to rise to its proper height. Is it possible for that body to consume all its time in questions of administration for a great length of time? There are certain burning questions before the dental profession to-day, and how long it will take to settle them I don't know; but so long as these burning questions are so prominently before the profession, it must necessarily consume very largely the attention of the Faculties Association. I think in time they will get away from all that, and when they do they are the proper body to discuss curriculum and methods of teaching. That is a representative body, organized, and can enforce its laws. This is more a convention, and not a representative body, organized for a specific purpose: to cultivate and develop the so-called practical subjects in dentistry and dental technic. It seems we have not found enough in these subjects to occupy our attention. Although we have been in existence only three years, there is a cooling in the interest manifested in the exhibits, for instance. I come here, as Dr. Kirk has said, and see one exhibit, and may be compensated, but there is not enough in this alone to interest a body like this year in and year out for a quarter of a century, and we are reaching out for something that will interest us, and in doing that we are infringing the courtesies of another organization; and therefore, rather than take action, I would advise a further discussion and consideration of the whole question. Dr. Black was doubtful last year whether it was practical at that time; Dr. Hoff says now is the accepted time. I think it would be well to let the Executive Committee take the liberty of bringing in such questions as it chooses for the next two years, and keep on in our old way. This body is young; it must make a record in some way, and that is along the lines for which it was organized.

So far as the question of curriculum is concerned, I don't see that it concerns this body very much, but I need not go into that. If we do it is merely in the way of suggestion, for we have no power to enforce our ideas; the Faculties Association is the proper body to do that. I don't know that I have anything further to offer in that direction, as Dr. Kirk has quite thoroughly covered all the points.

Dr. W. C. BARRETT, of Buffalo. I am in sympathy with the main part of the remarks of Dr. Smith. You can't make a part better and bigger than the whole. We must have some unity; some central thought; some central power; some single standard around which we can rally for the purpose of making a profession. Two rival heads in teaching, two rival associations, provided there is rivalry, will always work to the disadvantage of each other. I have always been in favor of, and at one time I introduced a resolution in the National Association, which was referred to a committee which never considered it, that the National Association should hold semi-annual meetings, and have possibly a division of that into sections, and make all teachers eligible to membership, and let them consider questions of operative technics, mechanical technic, orthodontia, and such other kinds of so-called practical work, and oral and didactic instruction, and then that the annual meetings be solely devoted to business; the semi-annual meetings being devoted to methods of instruction, and all that. That would make a complete organization. We must not lose sight of the fact that an organization or association which is to be a rival of the other must result in confusion, and must seriously interfere and split our profession into two separate parts, which may possibly war with each other. The future is what we must look to, and not simply the present.

As for the matter of unification, I don't think that is practical at all, and trying to secure a uniform curriculum for all the colleges seems to me to be foolish. I can readily see the advantage that might result in it from the exchange of students from one school to another. If they all have the same instruction, a student can go from one to the other without repeating the instruction and without losing something that might be essential to him. But I do not think it is to be encouraged. Our school has a complete graded course, no two classes ever coming together, everything being graduated from beginning to end. Others have no graded course, but go from one subject to another until they are through, without particular system. But to force all into the same rut would be an arbitrary application of force which I should not favor. I believe we are doing pretty well as it is. I believe the most advisable thing is, as I said, semi-annual meetings of the dental faculties; and if in due process of time it is possible to institute sections in the body so as to allow these meetings to be given to all forms of instruction, of whatever kind it may be, and then the annual session to be devoted to business, which is as essential to us as methods of teaching students.

Dr. G. E. Hunt. If my memory serves me right, this matter when it was brought up last year was discussed by Drs. Smith and Barrett in much the same language as this morning, and Dr. Kirk and myself said about what he has already said and what I expect to say, and probably the reading of last year's minutes would save all this. I am, however, surprised to hear Dr. Barrett say that there are schools in the Faculties Association that have not a strictly graded course. I was totally unaware of that.

Dr. Barrett. You are not posted.

Dr. Hunt. That may be, but I am surprised to hear it. As far as this body attempting to pass any laws in regard to the unification of the curriculum or on any other subject which affects colleges we all know, I think, that that is an utter impossibility. We cannot do it. We have power to make suggestions, which would probably be received with more or less favor by the men who do shape the laws which govern these colleges. In fact, there are a good many of us here to-day that are representatives of these same colleges at the Faculties Association, and it is natural to suppose that anything we agree upon here we would be able to agree upon there. I know we cannot pass laws which will control the Faculties Association, but we can pass resolutions and give opinions which will be received with a great deal of weight by the Faculties Association. The Faculties Association should do these things, but they are not doing them, and I don't think they will; and, since that is the case, why can't we save them time and trouble by coming to conclusions ourselves, after which all they will have to do will be to accept. I think this is pre-eminently the body which should consider these matters now, and if we don't consider them now they will never be considered in the future at all.

In regard to unification of the courses, I agree with Dr. Barrett that a complete unification of the course cannot be accomplished at this time. But I think a partial unification can be accomplished, and that it would be a most excellent thing for all of the colleges. I don't think the methods of teaching any particular subject can be followed by every other school and get the best results, but I do believe that the amount of time spent on most, if not all, subjects can be settled by this body. For instance, some schools teach chemistry three years; some only two years. Some teach anatomy only one year; some two, and, for all I know, three years. These things can be adjusted. If two years is sufficient to teach anatomy in the University of Pennsylvania, it is enough to teach anatomy in the Indiana Dental College. If two years are necessary for chemistry in one school, it is necessary in another.

Of course, we cannot define methods of teaching for each school, but we can define the length of time to be spent on them. If we could unify the courses so as to define the minimum amount of time to be spent on the various studies, we would have done a great deal. We have students coming from other schools, and it is very seldom that they do not go to the office and ask to be excused because they have completed a certain subject in another school. I have no doubt others here have had the same experience. That could all be done away with by unification to that extent only; that is, define the years in which certain branches shall be taught and nothing more.

Dr. JAMES TRUMAN. I was not at the meeting last year, and have not been present, with one exception, since the organization, for the reason that I was always under the hope, since I assisted in the organization of the Association of Faculties, that that body would take up the various subjects that this body has taken up individually. But after fifteen years' experience in the Association of Faculties, hoping against hope, I have come to the conclusion that that body never will do anything more than legislate on the various matters connected with our profession. It seems to me that that body of men have bottled up during the year all their antagonisms and hard feelings and they come to that association to ventilate them, and the result has been, as it was at the Niagara meeting, continual fighting, if I may use the term, almost from the beginning to the end. Now, to some of us this is disgusting, and for one I am tired of it, and I believe that the value of the Association of Faculties, whatever value it may have had in the past, is about completed. I am therefore here to-day to take part in this association perhaps more prominently than I have heretofore, because I believe that this work is to advance and, as stated by our president, this body in the future will take an altogether different stand from what it has in the past. I am wholly in accord with the views expressed.

So far as the views expressed concerning the unification of the curriculum, I don't think that is possible, but we can reach out toward that point, and I think we should reach out toward it. When we come to consider education, not only in our branch but in other branches in general scholastic training, there is a lack of unity throughout this whole country. It is altogether different from what it is on the Continent, where there is unification in all the schools. Take, for instance, Germany, where a young man can go from one school to another and start in one where he left off in the other. If we could reach that position here it certainly would be a great gain not only for general education, but in our own work or profession. This body must do the work that the Association of Faculties has failed to accomplish. This was work we supposed that body would accomplish, but it has not done so. Who is in fault I do not know, perhaps I as much as the others. We have so much to do in talking and wrangling over legislative matters that we have entirely forgotten the primary object for which the association was formed. I think the original position of this association was crude, because it confined itself to prosthetic and operative principles. You have your exhibits here, and they do good work, but they are not the principal things. We want to know how to teach. As Dr. Kirk has said, we want to make teachers. We haven't got them in our profession. It is one of the most difficult things, I presume, that every dean has to contend with, to secure men who can teach in the different branches. Many men can do the work, but very few can teach; and such is the object, as I understand it, of this body, to so instruct men that they may become teachers. I will not extend my remarks further or take any more of your time.

Dr. T. E. Weeks. I had not intended to speak on this subject, consequently my remarks may be somewhat rambling; but it may be well to emphasize the thought that was in the minds of those who organized this association. There was but one thought, and that was based on the fact that the Faculties Association never had taken up the subjects of an educational nature, and, as has been said, a number of the organizers were, or had been, representatives of their colleges in the Faculties Association, and they had come to the same conclusion that the preceding speakers have expressed, that they never would, although the association was organized primarily as a technic association, as an association of technic teachers, men who were trying to present in their respective colleges a systematic course upon such branches as could be taught to advantage by the laboratory method. But it very soon became evident from the interest manifested, not by technic teachers, but by teachers of every branch not represented by the laboratory method, that the scope of this organization must grow. And by its own force and impetus it will grow; we cannot help it. It is bound to grow.

I was particularly pleased, and as one of the original organizers of that institution I speak on behalf of others, in welcoming the new proselyte, Dr. Truman. Such men as Dr. Truman being with us, and others who looked upon us in something the same light as he did, it is an assurance of the continuous growth and success of this organization. Now, the one point I wish to emphasize is that our good friends who have spoken in the interest of the Faculties Association have nothing whatever to fear from this association. It was never intended as, and it never will become, the rival of the Faculties Association. It never can, from the nature of the constitution and purposes, be a rival to that association, and it never will aspire to be. I cannot entirely sympathize with Dr. Truman's impression in regard to the Faculties Association. I certainly do not wish to attend the obsequies of that association, but I hope you will swear off in a few things and lead a better life. In regard to our own association, I don't believe that any member of the association has ever voiced a sentiment or expressed a wish or desire to legislate in any way. That is not the object. It is to present methods of teaching and to discuss them, and that every teacher who attends will be benefited and will carry something away from the meeting which will enable him to improve his course. While unification never can result,—absolute unification,—still, at the same time, there may be a certain amount of unification which will be beneficial to all schools; that will be an inevitable result of our deliberations. I think it will be an advantage if we ignore in the future any idea of rivalry between the two associations, because there can be none.

So far as the extension of the principles of this body, it is already extended, and we don't have to pass any resolution to extend it; it will extend itself. I believe that is all I have to say on the subject, simply to emphasize that one thought that there can be no rivalry between the two associations. I think Dr. Barrett's suggestion is very good, but will it ever come? It rests with the Faculties Association, and not with us. It rests with the Faculties Association to extend an invitation to this body to unite along these lines, and when it comes it will be time enough to consider whether we will accept it.

Dr. W. C. Barrett. There seems to be a misunderstanding as to what its function really is. The most important work ever done was done at the meeting last summer. It was only done through a struggle. It could not be done in any other way, and it was only reached through fire and blood. The schools and teachers, who alone know what the curriculum should be, can establish that curriculum, free from the dictation of those who are not acquainted at all with teaching. What I say is not in denunciation of men or classes. It is simply the establishment of a principle. It was only reached through a long-continued battle, and I tell you the victory was complete; it is established, and it could not have been established in any other way. I thank God for the fight we had last summer.

Dr. T. W. Brophy. In the president's address, which was an admirable one, he spoke of whether it would be expedient to continue teaching anatomy as it is now taught, according to the rules of the Association of Faculties, or in some other way; and the same with regard to physiology and chemistry, and I am sorry that that was in the address, because it might lead some to think there were members in this body in doubt as to the advantages that students will acquire by the study of physiology, anatomy, chemistry, bacteriology, and other scientific subjects that are now taught in our dental colleges. It is essential that the young men should be taught these subjects. It is not possible for a man to comprehend a part of the body and understand its physiology and its pathology, and so on, without having a knowledge of the entire structure. If the dental profession ever comes to the conclusion that it is not necessary to teach these branches, it will be a retrograde step. It is essential.

As to the usefulness of this body and its relation to the dental faculties, I do not share with the unfortunate views of Dr. Truman in regard to the National Association of Faculties. The dental profession is on a very much higher plane to-day on account of the work of that great body, and if it had accomplished nothing else than the work done last summer through a long contention, it would have won a victory in the interests of the dental profession that would stand to the end of time. This association is but a midget compared with what it will be. It is just in the beginning of its usefulness. It started for the sole purpose of teaching technics or operative dentistry; later it added prosthetic dentistry, and to-day it has a field of work before it that was apparently not dreamed of, and that is everything that pertains to the whole dental curriculum. We have added technic physiology; it will be a part of this body by and by. The advance made in the field of physiology in the last ten years is something surprising to men who have not looked into it. Pathology, bacteriology, and so on, all these things must come up, and by and by we will see these branches presented by the teachers who have charge of them, and the work of this body will expand greater than anybody's ideas of expansion ever were, and you will find it one of the greatest educational bodies in this country. The National Association of Faculties cannot do this work. It is not their function. They are a purely legislative body. We all know how much work they have to do; we don't hesitate at the meetings when twelve o'clock midnight comes, but keep right on and work for good in that body, and it is not in the province of any man in this country to change it. It has a great work to do, and it must be done. Look at the number of schools, and I am told there are about twelve new schools in this country that want to come in. That will take time. Those who have been in the Executive Committee know what it means to go away three days before the meeting and work continuously before the work is done. It is true there are disturbing elements now and then, but we hope it will be better by and by.

I don't suppose Dr. Weeks and the other organizers ever dreamed this association would reach such proportions as we have now. It was through Drs. Weeks and Cattell that we branched out as a School of Dental Technic. I don't like the name, Mr. President, and I thank you for the suggestion to change it; change it to something which will indicate what its function is, and then let it grow as it will grow. As Dr. Weeks says, we can't stop it any more than we can change the course of Niagara. We will have a curriculum and lay out a course of study, and change the curriculum to meet the requirements of the profession, and after while we will have four years of work instead of three. I remember when the National Association was started in some schools in some branches there were but four months, and it has changed to a minimum course now of seven months in three years; and now we are going to have four years of seven months, or possibly eight months, and it has all been done by the work of the National Association. And that body is going to go on and do its work before it, and if we have to fight, we will fight to accomplish our ends, and we will win every time.

Dr. Hoff closed the discussion as follows:

I do not know what I can add to what has already been so ably said better than I can say it. It only convinces me of the fact that our session is too short. We ought to have had a day instead of an hour to discuss the subject, because I know there are many here who are ready to speak on the subject more at length. I feel that I could take half an hour myself to amplify what I have suggested.

I think we are all agreed so far as enlarging the scope of the association and whether the change of name is material, but the point I made in the address was that we should change our name so as to give the Executive Committee power to incorporate in its program for our consideration any subject it saw fit to place on the program. Now, we have simply usurped that function, and simply do it because we want to. We don't do it with authority.

As to the suggestion that this is to be a rival to the Faculties Association, none of us who have at heart the work of this association will for a moment consider that. We are not its rival. We are its helper; we are its right hand. That is what we organized for, and that is what we intend to do, and we don't intend to usurp its functions at all. It has been said that we must have the National Association; that it has its function, but I am also strongly convinced of the fact that this body has its function. We must consider what we are to teach, and then must consider how we are to teach it. So I suggested that, so that it might be in your minds, and could be considered whether or not it might be well to take up that particular item and discuss it thoroughly, so that we can come to some conclusion as to what we would attempt to do. I don't think that any one here understands that I am in favor of a reduction of the amount of anatomy or chemistry, or any of the other subjects that we teach. I am in favor most heartily of enlarging the scope, but I simply suggest this because we are met everywhere with the question as to whether dentists ought to know all about anatomy and physiology, and so on. In our own school I have had the greatest difficulty in convincing the teacher of anatomy that the dentist needs to know more than the anatomy of the mouth. And I have had difficulty in convincing our physiologist, who is a scientific man, and not a dentist, that our students need to know more of the nutrition of the body. The most important thing we have in physiology, perhaps, is the nervous system. He claimed we didn't need it; insisted we didn't need it, and even so with nutrition. And so it goes all the way through. What I think we ought to do, if possible, is to define our course; not that it shall be mandatory, but that we shall define it with the idea of establishing an ideal course of instruction for dental students. Then we will have something to start from. If any school sees fit to change that ideal and make another ideal for itself, it would be perfectly right and proper for it to do so.

So far as the National Association is concerned, I would say they could never bring that about. If it passes a law that schools shall teach a certain amount of anatomy there will be more or less modification of it necessary for the various schools, because of their peculiar environment. I do not think it would be possible for the National Association to make any such legislation. They can, in general terms, indicate what shall be taught and when it shall be taught, but some liberty and allowance must be granted to every school. If I were the governing body of the Faculties Association I would abolish every law it has enacted, and I would enact in place of them a code of ethics, and the schools would have the privilege of living up to that instead of obeying laws. I think you would not have as much wrangling as you now have. We want to raise the standard of general education and invite men to accept that as an ideal standard, and if they wish to modify it that is their privilege. We do not want to legislate at all.

In the other item, that of visiting schools, I think you have done wisely in accepting the invitation. I hope we shall be able to arrange our program to do that, because there is nothing we could do which is of more importance. If we can go as a body to visit these schools it will be better than to go as individuals, and it will not interfere so much with the program. I thank you for your kindly consideration of my paper.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, December 12, 1899, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William C. Deane, in the chair.

Dr. DAVID C. BAKER, chairman of the Clinic Committee, read the following

CLINIC REPORT.

The Clinic Committee begs to report that a clinic was held this afternoon at the New York Dental School, 216 West Forty-second street, with an attendance of about two hundred and fifty.

Dr. W. A. CAPON, of Philadelphia, gave a very comprehensive clinic on porcelain filling, making a number of fillings showing the relative heats required in the high- and low-fusing bodies.

Dr. F. A. GREENE, Geneva, N. Y., showed a novel method of making bands for collar crowns and fitting ready-made crowns. His method consists in making a fusible metal model from an impression obtained with a soft copper band. (See DENTAL COSMOS for February, 1900, page 190.)

Dr. C. A. MEEKER, of Newark, N. J., made a porcelain inlay from a plaster model made from a modelling composition impression. The case was a practical one from the doctor's practice.

Dr. SIDNEY S. STOWELL, of Pittsfield, Mass., exhibited a novel bridge, but one he has been using for a number of years. The bridge is principally for those cases which must be anchored to distal surfaces of cuspids. The novelty mainly consists in placing a gold filling in the cuspid and drilling a hole into same, and then fitting a lug which is soldered to the bridge. The bridge when finished is cemented only on the molar end. Dr. Stowell also exhibited duplicate of a bridge inserted before this society in 1887, and which is reported in first-class condition.

Dr. DAVID GENESE, of Baltimore, Md., filled a lower molar having a compound crown cavity. He first lined the cavity with oxid of zinc mixed with carbolated cocain, and then filled with amalgam containing thirty-three per cent. gold, the union between the amalgam and gold being obtained by the use of dilute hydrochloric acid in a rubber pad. The advantages claimed are non-shrinkage and non-oxidation.

Dr. W. L. Fish, of Newark, N. J., exhibited a splint for retaining loose teeth in pyorrhea. The doctor fits a soft piece of platinum to the palatal or lingual surfaces, strengthens same, and then fits little pieces of gold to the interdental spaces, fastening the two together with screws and nuts.

Dr. John I. Hart, New York, made a very beautiful porcelain inlay for a disto-approximal cavity in an upper left central. The inlay was made of high-fusing body set with Ames's oxyphosphate.

Dr. H. W. Northrop, New York city, demonstrated on a patient the repair of a porcelain tooth without removing the bridge.

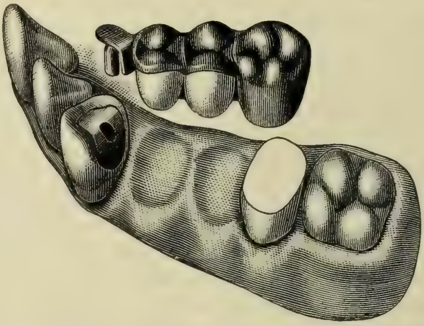
Dr. George Evans, New York, inserted a gold seamless crown, strengthened with pure gold, and inlaid on the buccal surface with the Jenkins body.

Dr. W. D. Tenison, New York, demonstrated by models the result of regulating, also the results of extracting the first permanent molar.

Dr. William Caillé, New York, showed a stump-wheel moistener which can be attached to any dental hand-piece.

Dr. David Genese, of Baltimore. Some years ago I had the honor and pleasure of being with you, and used an amalgam composed of twenty-five per cent. gold, twenty-five per cent. silver, and fifty per cent. tin. It was stated at the time that it was impossible to mix this amalgam in the proportions named, and at the request of one of the members of this society I sent an ingot of it to The S. S. White Dental Mfg. Co., and they reported that the assay came up fully to the standard. The only difficulty of placing this before the profession was the cost, which they did not think warranted them in making it. I have carried out a number of experiments since then with gold and amalgam, to get the effect of non-shrinkage and also of retaining color, and I have found that any of the best grades of amalgam on the market, with the sponge golds like Steurer's and the moss-fiber gold, can be chemically admixed, producing the desired standard described at the clinic to-day. The process is very simple: you mix your amalgam with just enough mercury to bring it together, so it is almost a powder; no excess of mercury; then take the gold and triturate it very thoroughly with the amalgam mass,—I prefer using rubber for that purpose,—and as soon as you bring in contact with it the hydrochloric acid dilute it becomes a perfect paste, thoroughly incorporated, so the gold cannot be squeezed out nor the amalgam, and there is no excess of mercury. It is then washed, preferably with a stream of warm water, dried on blotting paper, then subjected to a washing of pure alcohol and dried again, and is then ready to insert in the tooth. Unlike the amalgam I presented formerly, it does not set too quickly, but gives you time to build up a fair-sized filling. If it crystallizes too soon you can use a warm burnisher, and that will enable you to finish it. On the next visit of the patient you can polish it, and it gives exactly the color of finished platinum, and no discoloration of tooth-structure.

Dr. Sidney S. Stowell, of Pittsfield, Mass. I have used for a number of years the bridge which I illustrated this afternoon, anchored into a large gold filling in the distal surface of a cuspid. I cut my grooves deep, and make a box or dovetail anchorage in the palatal margin of the cuspid. The filling is then placed as strongly as may be, and made a little more than full. Into this filling I bore a hole about the size of No. 14 wire, American standard gauge, and fit a platinum-and-iridium dowel. Upon this dowel I place a disk a little smaller than the entire circumference of the filling. Gold is then burnished over it. Beyond this there is nothing unique in the filling at all. The dowel furnishes the forward anchorage or support of the bridge. The bridge, of whatever construction you wish, is then cemented onto the molar foundation. Under no circumstances should it be a cemented joint in the cuspid filling. It should be a loose joint to allow for the slight vibration of all teeth. This is no new scheme of mine; I have used it for ten years, and can speak with considerable confidence. Place this filling yourself; do not trust any one else with it. It should be stronger, of course, than for an ordinary filling, because it serves as an anchorage. The model I showed this afternoon, of a case I exhibited before this society thirteen years ago, was that of a bridge consisting of two bicuspids made with the Logan crown soldered to a Richmond foundation, and anchored to a large gold filling in the molar. I had the patient here then, and exhibited the case at The S. S. White Dental Mfg. Co.'s depot. I brought this model, and speak of it now because I saw the case only two or three days ago, and to all appearances it is as good as new. There was considerable opposition expressed in reference to it at the time I presented it, many gentlemen claiming it was not practical. Our esteemed and departed friend Dr. Atkinson championed the cause, to my great delight and relief at the time. The case has proved to be a practical one. I am always glad to meet you, and thank you for calling upon me.



Dr. W. A. Capon, of Philadelphia. I do not know that I have any particular thing to say, except to express my gratification at the way I was received this afternoon. I go away from New York this time with the satisfaction and feeling that I have put a few on the right track in this burning question of the day,—porcelain inlays and high- *versus* low-fusing bodies. Quite a number of gentlemen were around me to-day who were thoroughly interested. I was asked and tried to answer a great many questions which were put to me, and I had good facilities for my apparatus. The conveniences were better than I am usually accustomed to, and I can only say that my first clinic before the First District Dental Society of the State of New York has been thoroughly satisfactory, and I am pleased to have met you all. If there is any question any one would like to ask, I would be only too pleased to answer it as best I can.

The PRESIDENT. I had the pleasure myself of witnessing the clinic of Dr. Capon, and I consider his class of work beyond that of the ordinary man.

Dr. JOHN I. HART. The operation I did was the restoration of the disto-occlusal surface of a left superior central, and it seemed to turn out satisfactorily. I was impressed by the interest manifested by those surrounding the chair and referred to by the last speaker, and I think there is no question of the general absorption of the profession in porcelain work. I think the society could give many clinics on porcelain work and secure a large attendance. The operation was described so completely by the chairman of the Clinic Committee that it seems unnecessary to repeat it in detail.

Dr. H. W. NORTHROP. In what I gave this afternoon I make no claim for originality. It is one of the oldest methods of repairing a broken porcelain on a bridge or crown in the mouth. While the method is not new, the detail of manipulation is often puzzling, and my endeavor was to demonstrate its practicability universally for cases of the six anterior teeth. An appropriate facing being selected, holes to correspond in position to the pins are drilled through the backing or bridge, slightly countersinking on the under side. Grind the porcelain to fit nicely, letting the pins extend through the countersink. Set the porcelain in thin cement, and when hard rivet the end of pins in the countersink, using an ordinary plate punch, with pin end to spread the tooth pin, the opposite part of the punch resting against the face of the tooth, protected by a napkin or pad for a cushion. The heads are finished with a burnisher and polished.

For replacing bicuspid and molar facings, where the bridge is too thick for the length of pins to reach through for heading, the plan may be nearer original, as I worked it out myself, although others may be doing the same thing. A horizontal slot is drilled in the bridge a little longer than sufficient to allow the pins of tooth to slip in, and depth about one-half the length of pin. With a wheel bur extend the length of the slot at the bottom so as to form an undercut for the bent ends of the pins to catch in. Then bend the tooth-pins at a short right angle, one each way, toward the sides of tooth, to catch in the undercut portion of the slot, one pin entering the slot first, so that when in place each pin slightly catches and cannot come out. After it is well fitted set in cement, and it will be as solid as if soldered.

If the clinic will benefit any one who saw it, I shall feel well repaid for my demonstration.

Dr. W. D. Tenison. My object in presenting the models at to-day's clinic was to show the results of extractions, particularly of the first permanent molars. The question has come up in the last few years, and has been discussed and papers written on it by prominent men in our profession regarding the extraction of any permanent tooth, and particularly the first molars, under any conditions. It is held that the results of extraction are always bad, but I claim quite the contrary. I do not wish to be put upon record as saying that it should always be done. In fact, there are times when the extraction of these teeth, or any other permanent teeth, would be a crime; in many cases, I might almost say in the majority, where the first molars are presented to us and show a broken-down and diseased condition of the pulps, if left in the mouth and treated, in after-years, being dead matter, they have to be removed as a result, then there are gaps or a tipping of the second molars. I claim that when that condition presents itself to us it is our duty to do the best we can for the future health and comfort of our patients, as judgment dictates, and I think the proper thing to do is to extract the first molars just before the time the second molars are making their appearance. In my own practice, I have never seen a case where the teeth tipped after such treatment. I think the gentlemen who saw the models to-day will bear me out in that respect. It has been claimed that the occlusion of the teeth is destroyed, that the cusps are worn down, that the teeth decay, patients cannot masticate their food, and all sorts of bad results follow the extraction of any permanent teeth, more especially the first molars. The models I presented to-day I think will controvert that entirely. Furthermore, if I had ever supposed this subject would have come to a public discussion, I could have had at least one hundred models to present, instead of the ten or twelve I presented to-day. In my early practice it was the custom, when we had a case presenting itself in that condition, to extract the first molars, because we knew nothing else to do; but afterward I saw the benefit of doing it, and have followed the treatment since. There are other cases where the first molars are in good condition, and there is a crowding of the teeth; even then I would in many cases extract. A large majority of the first molars are defective; in such cases the extraction of them is the best thing to do to save the remaining teeth.

I do not go outside to get models or take impressions of mouths to show results; I show the results of my own individual practice. The regulating cases I presented of course I cannot explain here; you have seen the models and results.

On motion, the report of the Clinic Committee was received with thanks.

Incidents of Office Practice.

Dr. Genese. I have been for some years doing work of the kind I will show you photographs of, for the Johns Hopkins University and the Garrett Hospital and Baltimore University School of Medicine, in Baltimore, and of all the work I have done, this has been about the first photograph I could get any one to sit for. It is a case of lupus, aggravated by an incompetent person getting the case, and leaving the patient in a worse condition than when he started. It was in a fearful condition from the action of arsenic. In counteracting this, I put him under medicinal treatment at the Johns Hopkins University, and then they sent him to me one day when they thought they had him in a fair condition, but the exudation was still very profuse. I applied on the surface the carbolated cocain that you have had notice of since 1883, and got a thorough healing of the tissue. I first dissolved the rubber, then colored it with a very fine pink powdered glass to get the hue of pink, using chrome as the yellow base for tinting, and then after molding it in wax, I pressed it into form and it came out a good color from molds lined with tin foil. I regret I have not a photograph of the nose itself. It was made to keep on without spectacles. Very delicate springs passed over the posterior nares, and when he shook his head it did not move. I brought him before the professor at the Johns Hopkins University, placed him in the chair, and asked him to examine the deformity, and he failed to find it, so near the natural appearance was it. I have been unable to get the true adaptation by modeling to a plaster cast. I get it as near as I can with wax, and then finish it on the face of the patient with the molten wax little at a time. It feels a little hot at first, of course, but they do not mind it after a while. Leaving it on the face of the patient and talking with him, I get the play of the muscles of the face and the perfect adaptation of the edges of the artificial work, which is not altered again. The work is finished on the face by grinding with fine emery round points and no attempt at polishing after, which leaves it more natural in appearance.

Dr. W. W. WALKER asked for a few minutes in which to show an electric furnace.

Dr. WALKER. I spoke to Dr. Capon about this electric furnace after the clinic, and from my explanation he thought it was the ideal furnace,—the small one for inlay work, and this one for continuous-gum work. It is used with a rheostat. All of you who have had experience in using these furnaces know what occurs if you get too much heat. The wire burns, and it takes from two and a half hours to two weeks to repair them. This furnace is started in the usual way. The roof, floor, and two sides are separate. You can take them out by simply detaching the platinum wires at each side. You can have duplicates of any of the parts in case of an accident; just cool it off, take the wires off, and put a duplicate part in. The slabs come with the furnace. This is Dr. Timme's newest furnace. He has another small one, which will be shown at the Odontological Society. This one is large enough for a piece of continuous gum. You have no idea of the heat you can get with it. If you want to cool off one side and put in a plumper, you can fix this so you can throw all the heat on one side. I sent to my office for it just now, so Dr. Capon could see it.

The PRESIDENT. We will listen to a few words from Dr. F. LEGRAND AMES, president of the New York State Society, before hearing the paper of the evening.

Dr. Ames. I have no set remarks with which to entertain you. I can assure you it is a great pleasure to meet you, and it has been very gratifying to attend your clinics. It was my privilege to suggest clinics in the district societies as a medium of help and interest. I am sure you who attended the clinics to-day must have been greatly edified. It seems to me that the single operation performed by Dr. Hart was well worth the sacrifice of time and travel to witness it. We hope to have a good program at the State Society next May, and I cordially extend you an invitation to be present.

The paper of the evening was then read by Dr. Charles S. Butler, of Buffalo, entitled "The Dental Educational Problem."*

Discussion.

Dr. L. Ashley Faught, of Philadelphia. It has been a great pleasure to me to listen to this excellent paper by Dr. Butler. It is one of the most admirable papers presented on this subject, and shows most careful thought and work. It would be well if we all could sit down and read it thoughtfully, and study it, that we may be led in our little capacity in our own localities to put our shoulder to the wheel to help forward in the right way this great work of dental education. Going back twenty-five years to the time when I first looked in on the profession, the literature was filled, even at that day, with discussions upon dental education. From that time until this we have been constantly reading and studying this subject, and yet we are to-day really only upon the threshold of that which will lift our profession into the position which it should occupy. The essayist asks: Is it not surprising that our profession should be so slow to see the real point at issue? Yes, it is, and yet no, too; yes, when we think that we have had the advantage of watching this same development in our "mother" profession, shall I say?—medicine. We have jumped in a few short years,—sixty years,—even within ten years, over a ground which has taken her a much longer time to cover, and yet we are confronted by a danger greater than confronts her. The statistics show that the percentage of increase during the last ten years of those studying dentistry has been two hundred and eighty-four per cent. greater than that of those entering any other profession. It is time to stop and think, and the essayist points out a very important matter,—the unethical surroundings from which a large majority of those entering the profession are taken. There seems to be an overweening idea among those engaged in certain lines that in the practice of our profession there is to be found that great power,—the almighty dollar. The main thing to them is how easy is the entrance, and how quickly can we put ourselves in line to carry on the business. That is the way they look at it.

The first real paper that has ever been read upon this subject, looking to the higher ideal, was that read by Dr. Darby last May in Boston. I felt that those who had labored in this cause for so many years had not labored in vain, when a professor in a prominent university will come out with a paper of that kind on the higher preliminary training required before entering the study of dentistry. From about 1880 to the present there has been a constant struggle and striving upward, and everywhere higher standards of entrance are being fixed—I wish I could say are being enforced. I feel that that phase of the problem is in a measure a thing of the past; that is, the question of a higher preliminary training. A higher entrance examination will soon necessarily fix itself for the profession. It has got to come; you cannot keep it back. The whole trend of the educational world is forward, developing along higher lines. Those colleges that we call the "Big Four" and others are now trying to fix a uniform entrance examination into their organizations. Very soon a student will not prepare for entrance into this university or that college, but will prepare to enter college. The high schools must give him a training which will fit him not for some particular institution, but for any institution. That will all help us. When I took two years ago a very strong interest in high school teaching throughout the Union, and went into a long correspondence with the state superintendents of public instruction, I found that there was no such thing as a uniform standard of high school education. It varied often very much within the same state, and I discovered that we could not map out and definitely fix as a standard a high school graduation, because it did not mean anything definite. However, when this requirement of the various colleges becomes a fixed one the standard will be uniform, and will help us; because when we say we will require a graduation from high school we will have something definite.

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*Printed in full at page 324 of the current number.

I do not wish to talk all the evening on this subject. It is very dear to my heart, and I have spent a great deal of time on it. One thing I will say before ceasing to speak, to which reference is being constantly made, and that is the necessity of manual training. That is what I consider the great work of the future. Our students in the high school courses should get that manual training and add it to the other training, so that they shall acquire the development of a certain amount of finger skill. The manual training idea is not the idea simply of developing a finger skill or a manipulative skill; it is the training to exact thought, and that training is really a mental gymnastic. One of the things which we need to make a success of in the dental profession is that we shall develop habits of accurate thinking; accuracy in all relationships in which we come in contact with the profession, both among ourselves and among our patients.

Dr. Wm. Jarvie, of Brooklyn. I have listened with much pleasure to the paper of Dr. Butler, for it is one of the most careful presentations of this subject that we have had for some time. Many points with reference to dental education were touched upon, but, as there are other speakers to follow me, I will confine myself to just a single thought. Dr. Butler is quite pessimistic as to the present and also the future of dental education. I am just the reverse. I do not see anything concerning our profession to encourage me quite as much as in what I believe to be the advancement of dental education that has taken place during the past ten years, the very decade in which the essayist thinks there has been almost none. Since 1879 no one has been permitted to enter the practice of the profession in this state without having a diploma. During this twenty years one state after another has required the same standard, most of them within the last ten years, so that now about the only way to enter the dental profession is through the dental colleges. Before 1879 the larger proportion of those who entered the profession received their education from private preceptors. As a dental examiner for the last twenty-one years I have come in contact with a very large number who are entering the profession, and I have noticed the gradual improvement in the status of these men socially and intellectually; and my experience is that the men now coming into dentistry in this state, and I presume in most of the states, are the equal of those entering any other of the learned professions. And this improvement will continue.

I do not want to say one word to-night against the colleges. There are colleges and colleges. There are faculties and faculties. In our colleges and faculties we have scores of men who are as much interested in the advancement of this profession as any can be. There are, again, those who, for self-interest or other reasons, think that the elevation of the standard for matriculation will keep out a large number of men from their institutions who would otherwise be in them, and they would thus be cut off from the fees incident to such pupilage. Notwithstanding this, the tendency is upward, and that tendency is irresistible.

Dr. AMES, of Albany. It seems to me that this paper is one of unusual merit. It appears to deal with the teacher as well as with the pupil. If I am able to grasp one of the salient points, it is that the teacher shall not be handicapped by necessity as a bread-winner, but that he shall stand free from the struggle for the necessaries of life; that he shall be placed in such a position that he can give his very best thought and energies toward impressing the highest attainments upon the pupil. Therefore it seems to me that any movement looking toward the endowment of a college or university should receive the hearty and loyal support of the entire profession.

Dr. WILLIAM CARR. It was my good fortune to have a short interview with the essayist of the evening on Sunday last, on which occasion I attempted to secure from him some facts covered by his paper; and was unable to obtain as much as I could have wished, but still sufficient to enable me to present to you this evening my thoughts on several points contained therein.

The evil of a multiplicity of dental schools is one of the great drawbacks to professional advancement and a higher dental education. I agree with the essayist that a multiplicity of these schools tends to lower the moral, professional, and intellectual standards, and I do not believe that one who is not educated for the dental profession should be at the head of a dental department or school. There is to-day a strong effort being made to lower the standards of preliminary education and of professional attainments, and consequently to lower the standard of the dental profession of our state.

In line with the above I heard the dean of a dental department state not long ago, as an argument in favor of lowering the standard of dental education, that the dentist was not in the true sense of the word an educated man in the same acceptance of the words that a physician was; in other words, that a dentist did not require the same education as a medical practitioner.

I contend, Mr. President and gentlemen, that we are not a trade nor a handicraft, but that dentistry is a branch or department of medicine, and that we are specialists of medicine just as much as the otologist, the ophthalmologist, or the orthopedic surgeon. I believe that one who intends to treat diseases, malformations, and maladies of the oral cavity should have just as much education as he who specializes his practice to the treatment of the tracts of the nose, the ear, or the throat.

Now, as to the question whether dental legislation during the past ten years has been productive of any gain in dental educational standards, or increased the moral and ethical status of our profession, I feel that the statement that dental legislation *has* done much for dentistry is a self-evident truth. No one who looks back and considers the educational requirements of ten years ago and compares them with the standards prescribed by law in this state, as well as in many other states of the Union, can, I believe, honestly contend that the reverse of our claim is the case. Yes, gentlemen, dental legislation *has* raised the moral, ethical, and intellectual standards of our profession.

I cannot agree with the essayist in his belief that the dental school should be an institution apart from the medical school, and be separate from the university. The greatest hope I have of advancement along the lines already laid down for us to follow is to see all independent and separate schools and colleges relegated to the rear, together with other venerable fossils who have outlived their usefulness, and in their places a few strong, sturdy dental departments connected with our large universities. You must all admit that the facilities for the study of physiology, histology, anatomy, pathology, chemistry, materia medica, and surgery are very much greater in a dental department of a university, connected with which is a well-equipped medical department, with its laboratory, clinic, and dissecting rooms, than could possibly be obtained in a separate dental school or college. To-day in this state, and I presume the same condition of affairs exists in other sections of this country, no provision has been made for supplying to the dental schools material, per capita, for dissection, and here in our Empire State, and particularly in this city, dental students are obliged to go from college to college in order to obtain material and opportunity for dissecting.

Not to prolong my argument, I believe I have shown cause for my belief that an ideal dental education can only be acquired in an institution which is a department of a well-equipped and permanent university; a department where the question of ways and means does not enter so largely as to paralyze the energies of the faculty, and where financial questions do not dwarf the educational facilities, as in the case of certain independent dental institutions we might name if advisable or necessary at this time.

In view of all these questions, I feel that the time is not far distant, in this as well as other states, when the separate dental school will be a thing of the past, and that the establishment of such dental departments will ultimately lead to the raising of our profession to the plane which I believe with all my heart its dignity and importance entitle it to occupy.

Dr. Walker. I never expect to see the time when my ideal of a college will be realized, for the simple reason that I do not believe any organization will ever have money enough to start a college of that kind. The ideal college is where a professor will illustrate practically what he lectures about. For instance, Professor Darby, of Philadelphia, who teaches theory; he goes right down on the floor and shows you the practice; not where it is taught by one man and fumbled over by a clumsy demonstrator. That is the great mistake in dentistry. The ideal teacher is the ideal manipulator, and the man at the bench. Have a dental college built on the idea of a Paris omnibus; take in so many and no more. It will take a great deal of money, and we may not live to see it, but we will not have a perfect college until that time arrives. It has come under my knowledge recently that the professor in a college would say one thing and the demonstrator would say just the opposite.

Dr. R. M. Sanger, of East Orange, N. J. The essay has been to me exceedingly interesting and instructive. The author has begun by saying a good word for the colleges, which is so contrary to the usual custom that it rather took my breath away. Usually the essayist begins by throwing stones, and then tells how sorry he is that he had to throw them. It is true, as Dr. Butler has said, that until the college can be taken out of the realm of a money-maker you cannot get the ideal college; but all advancement is in waves, not straight lines, and we are slowly but surely reaching the point when the dental educational institutions of this country—the leaders of the world—will reach the point where the money question will not be a factor. Dr. Carr's remarks touch the keynote of the coming time, in that he has associated the ideal school with the university. Next to that comes the endowment of the chairs as parts of the university. The dental profession are largely to blame for the present position of the dental schools, in that their own selfishness has prevented them from taking a just pride in their *Alma Mater.* When prosperity has come to them they have forgotten those at whose feet they sat, and instead of giving of their sufficiency a little toward bringing about the desired result of a perfect educational institution, they have thrown stones at the institution and told the faculty what they ought to do. This essay is teaching the right course. It is carrying us upward. It is one of the high crests of the waves of advancement in dental education. I congratulate this society and congratulate Dr. Butler on the high stand he has taken.

Dr. E. A. Bogue. I have just come from a theater of action of which we here can know little. I allude to the dental educational question in France. It is brought very forcibly to my mind by the essayist and by Dr. Carr's remarks. Both may be summed up in the two points of manipulative skill and educational requirements. About eighteen or nineteen years ago an effort was made to establish dental teachings in Paris. It was a failure. The apprentices and mechanical dentists and men without degrees then got together and made another effort, which was a success. Among those gentlemen who organized the first successful school in France there was probably not a single well-educated man, professionally speaking, yet that school has gone forward, and now has taken its position among the educational institutions recognized by the government as of public utility. Shortly afterward a number of medical men undertook to establish a school. That has been but moderately successful, and is to-day only very moderately successful. A little while after the second school was established the law was passed which bears so heavily upon all those wishing to enter France to commence the practice of dentistry. What are the provisions of that law? It requires three years' instruction in a school, and up to this moment the government has no school. There are three schools, but they are all private institutions. It requires three years' instruction in a school, followed by an examination on the part of government officials. These officials are taken from the ranks of the medical faculty. What is the result? Whereas in the beginning, at the school organized by the apprentices, manipulative dexterity and skill were in the ascendant, to-day they drop right away. Now the students are studying to be able to answer the questions propounded to them by medical practitioners, then they were seeking to become qualified as dentists. You can easily imagine the result,—manipulative skill is being less and less required to meet the requirements. A law still more stringent exists in Austria, where no man is allowed, except by imperial decree or police concessions, to practice until he is graduated at the medical school of Austria, which requires, I believe, seven years. I cannot find that there are any remarkably skillful practitioners in Vienna, the capital of Austria. There may be some others in the country, but I have made diligent inquiry, and those who stand the highest in skill, not in knowledge, are a couple of gentlemen who hail from America.

To return to the point. As Dr. Sanger just remarked, our profession does advance in waves. At one moment the waves seem to raise the manual dexterity, at another the educational or intellectual qualifications. Dr. Eggleston, who organized the School of Mines at Columbia College, had the right idea, that any one who undertakes to accomplish something with his hands understandingly uses both hands and mind. Our greatest strength will appear when we are able to unite our special teachings with those of a strongly-established university that lives after we are gone, and that is not depending upon the whims of a few or the pocket needs of the many, for, as I suppose is known to every one here, the salaries of the teachers are paid them by the university, regardless of the classes, whether there are one dozen or one hundred dozen. In that case the essayist's desideratum might be accomplished. The teachers in such universities are selected men, and our specialty could there receive the kind of instruction in manual training that goes from hand to head.

Dr. O. E. Hill, of Brooklyn, N. Y. Every one who has spoken is either in a college or on a Board of Examiners, and I am the only outsider. I am utterly surprised at some of the positions Dr. Butler takes. The law of the state of New York has raised the standard of dental education all over the United States. We have been thirty years at it; not ten years. We have given the colleges notice time after time what we were working for,—to bring the law of the state of New York and education where it is to-day. Is not a man a great deal better when he has a certificate of the high school education than when he goes from a plow or anvil into a dental college? Up to within two years a man of that kind could go into a dental college, but not in the state of New York. The state of New York takes that position, and we are very proud of it. Where were we thirty years ago as a profession? Or even twenty years ago? To-day in this state our educational system is under the control of the regents, the best system in this country. What do we bring about for these young men to-day? If a man is examined in the state of New York, and gets his certificate, our idea is that it should carry him to any state in the Union without re-examination. Any state and every state in the Union that will come up to the standard of what New York is to-day we will be glad to exchange licenses with. That shall be the universal law of the United States. It is the only way you can get a universal law, through this Board of Examiners. Look at the students that came from the colleges five years ago, and look at them to-day. Ask the examiners the difference. You have no idea of the advance. What has done it? The law of the state of New York.

Has there been a college in the last thirty years that voluntarily has come right out and said this, and then lived up to it, "We will not take a student unless he is so far advanced in his ordinary or common school education"? Did not, fifteen years ago, the deans of the various colleges meet here and sign a sort of compact that they would require a certain amount of preliminary education before they would receive students? What was it good for? Every college in the country was accusing the other of not living up to it. If I am correctly informed, within six months two gentlemen who were refused admission into a college for want of preliminary education went to another college in the same city and were taken in, and all they had was a letter of introduction. They had been examined at one college and thrown out, and they went to another and got in without examination simply through this letter. The laws of the state of New York to-day have advanced the dental profession more than any other one thing that has ever been done. We have been thirty years at it, and we have told everybody in the mean time that we were going to do it. We had our Board of Censors, and when we got ready for the law as it is we turned them into a Board of Examiners with their experience of twenty years. There has never been one single charge against the New York State Dental Society, or the Board of Censors, or the Board of

Dental Examiners, that there was the least wrong. At times we have had some trouble, but never has a law passed the legislature and gone to the Governor that there was anything wrong in it that would oppress a brother practitioner. And so has it been carried on from the beginning, honest and straight right through, and we are going to keep at it. We have New Jersey, and will soon have Pennsylvania, and very soon an examination before either of those boards will be good in any of the three states; and we will gladly welcome every state in the Union on the same basis.

Dr. BUTLER. I do not want to go from here leaving the impression on any one's mind that I have taken a position, or for a moment think that the profession has not advanced both educationally and ethically during the past ten years. I made no such statement in the paper. I said there was a question in my mind whether this legislation has done what my good friend Dr. Hill thinks it has. In the first place, we cannot get a law that is in advance of the education and status of the profession; at least not in advance of those who are instrumental in framing the law and bringing it into a statute. Therefore it is not the law, but the natural trend and advancement of the profession that has evolved the present condition. The law has not been in advance of the profession. As far as their influence on the colleges is concerned, I think Dr. Hill's remarks bear me out in saying that all this legislation has not yet had the effect of bringing them into honest and harmonious relations either with the profession or themselves. If I were brought in contact with the enforcement of the law, as Dr. Carr is, possibly I might think differently, because he sees its police regulation, the restraining of men from doing evil things. This is the power and majesty of the law. I believe in law and in order. I believe also that the law has done very much as a restraining force, in that it has prevented men with evil tendencies from dragging us back more rapidly than we have been enabled to go forward.

The trend of the profession has been steadily upward, and it is just that which has given us the enlightened legislation which we have received. The legislation of New York, Pennsylvania, and New Jersey combined could not produce the conditions referred to by Dr. Hill. Nothing but the moral and ethical status of the profession in those states could do it. My feeling is that we are depending altogether too much upon law, instead of honor.

I want to say just a word on the question of high school education, as mentioned by Dr. Faught. Dr. Hofheinz, in the paper quoted from, suggested the advisability of the public school system organizing departments in technique for students who might desire to study dentistry. I do not understand that it is either the purpose or the function of the state to specially educate students for any particular profession, nor have we any right to expect it. It seems to me that this question of technique education must be undertaken by the dental schools. I mean technique as pertaining to our profession, and which is so essential to a successful practitioner of dentistry. *That* qualification should be ascertained in the student before he has spent three years of time and money in obtaining a degree, so that if he has not the capacity to acquire the technical manipulation necessary for a successful dentist he should be stopped before he has devoted three years to the study of a profession he has not the ability to practice. It was with that idea in mind that I suggested in the paper that the *schools* must sooner or later organize a course of at least one year in technique work, which should be preliminary to matriculation for the degree; and any student failing to develop in that time satisfactory progress in technique work should not be permitted to continue the study of dentistry.

Dr. HILL. Your intimation that the law is a failure rather hurts me. Take the law of this state. Students cannot enter colleges without certain preliminary education. Are we better off in forcing those colleges to do that thing? Are we not better off than we would be if we were ten years back?

Dr. BUTLER. That is not the phase of the question of which I was speaking. I meant in regard to holding the colleges to the requirements of the law.

Dr. HILL. That will certainly be misunderstood by others, although I understand what Dr. Butler means.

Dr. BAKER. Were not the men better ten years ago who came from the laboratories of the dentists than the men who come from the high schools to-day?

Dr. BUTLER. That I cannot answer. It should be asked of Dr. Starr or Dr. Hart, who are brought in contact with these students, as I am not.

Dr. HART. I rise to move a vote of thanks from this society to Dr. Butler for his very able and exhaustive paper.

Motion carried.

Adjourned.

B. C. NASH, *Secretary.*

MARYLAND STATE DENTAL ASSOCIATION.

(Concluded from page 270.)

DR. A. C. BREWER, of Baltimore, read the following paper:

SUGGESTIONS ON PORCELAIN.

In the few words I have to say I will deal separately with the practical points of the work, describing each step; while a great deal I will say may be a repetition of what has been written, I hope you will be able to glean a few points from my experience.

In the approximal cavities of the front teeth never attempt any operation without a large separation, with the exception of such cases where the labial or palatal wall is gone to the depth of the bottom of the cavity. In such cases very little separation is needed. In compound cavities of bicuspids and molars, about the same separation is needed as for large gold fillings. In the preparation of simple approximal cavities of the anterior teeth there is little to suggest, with the exception that all cavities should be slightly flaring from the bottom to the orifice of the cavity, avoiding all undercuts. In contours of the front teeth all edges should be at right angles, with the exception of the thick part of the tooth near the gum, where it should be flaring from the bottom of the cavity to the palatal and labial surfaces, gradually sloping off to a right angle about a line from the cervical edge. This is done to avoid any thin right-angle edges at the cervical margin. In the preparation of contour cavities of the front teeth, the cavities should be at right angles from the bottom of the cavity to the orifice, where it again turns to a right angle. Cavities formed in this way will retain fillings without undercut or without grooves in the porcelain, but of course it is best and more practical to take all precautions.

In compound cavities of bicuspids and molars, free access should be made from the occluding surface. Any deep undercuts that, if supported by cement, would be strong enough to withstand mastication should be filled with cement or Hill's temporary stopping before the matrix is made.

In polishing the edges some use fine stones; others use diamond points. I have tried them all. The best, in my experience, is a round, smooth burnisher made soft by heating, rotated by a high speed in the engine, kept wet with the pumice, and for right-angle surfaces the thin Perfection cloth cuttlefish disk made by The S. S. White Dental Mfg. Co.

Making a Matrix.—In simple cavities use a piece of gold just a little larger than is necessary to make the matrix. In contours of the front teeth and compound cavities of bicuspids and molars use a piece of gold large enough to take an impression of about two-thirds of the labial and palatal surfaces of the front teeth, and the same on the occluding surface of the compound cavities of molars and bicuspids, leaving it extend just slightly over the cervical margin and the margins looking to the cheek and tongue. For swaging, the pliers with pieces of spunk is the best, using first small pieces of spunk, so as not to crowd the gold against the margins, causing it to tear, but with an effort to swage the bottom first, being careful that none of the surplus gold is turned over the edge until the cavity is swaged.

After the cavity is filled with spunk, the spunk protruding out past the edges, the swaging is completed with a thin-ridged flat burnisher pressing on the spunk. In approximal cavities of the six anterior teeth, where the labial wall is intact and the palatal wall is gone, let the gold extend just a line past the labial or palatal edge, as the case may be; but do not turn the edges down, as leaving the edges stand out straight on one side will make it very much easier to remove the matrix without causing any distortion to the edges.

In a great many cases it is necessary, to better facilitate the removing of the matrix, by swaging the cavity and before the gold is turned down over the edges, to remove the spunk and with a round ball amalgam plugger, well polished, burnish all the places where the gold has slightly folded, or from any other cause not perfectly adapted; remove the matrix from the cavity, trim the cervical margin, just leaving enough lap over the edges, at the same time trimming any other surplus gold that is not needed.

The matrix is now placed on a sheet of mica and annealed, replaced in the cavity, and the swaging completed. Some have advised the taking of impressions of part of the adjoining teeth, that they may have something to guide them in contouring; but this complicates the work, as it is almost impossible to prevent the porcelain from flowing over such surfaces approximating the cavity. The use of wax has been suggested, but is of little value, except where pins are used or the cavity extends under the gum, as when you remove the spunk the gum forces the matrix up, and you are not sure that the matrix is perfect.

Such cases may be filled with wax rather stiff, forcing it with a flat burnisher, being careful not to use too much wax; and with a thin burnisher remove carefully all wax between the teeth at the cervical margin.

Vaseline is suggested for coating the cavity before making the matrix, but is of no use except to hold the matrix in place while burnishing the gold. The matrix is more easily adjusted when no fats are used. In removing the matrix, the best thing I have found is a spoon excavator; one that cuts by pulling, being made on the same principle as a hoe excavator. This is inserted in the bottom of the cavity, and with a slight pulling motion the matrix is loosened, when it may be teased out with any instrument convenient to the case.

Investing.—For this purpose Dr. Jenkins has suggested powdered asbestos. It has the advantage that it can be cooled off rapidly by allowing the bottom of the investing cup to come in contact with cold water. The gold is not so likely to burn. I have found it almost impossible to burn No. 40 gold in the Jenkins furnace when invested in asbestos. Investing is best accomplished by filling the cup, leaving it higher in the center. Place the matrix carefully on the high point, then with a small instrument tap the handle of the cup, or the cup, until the matrix settles down well to its place. Do not use force directly on the matrix under any circumstances.

To dry out the investment Dr. Jenkins uses a small flame from the blow-pipe about one inch from the handle, but in my experience it is less trouble to place the cup on a sheet of asbestos over the gas stove, turning the gas down low, so as not to boil the investment. Where wax is used place a small piece of spunk on top of the wax to absorb it as it melts, as wax is very likely to cause the investment to boil or puff up.

After the investment is dried out, it is cooled rapidly by holding the bottom of the pan in cold water. A tumbler filled to the top is the most convenient. Then, with a small medicine dropper, wet the investment with absolute alcohol, and keep it wet while placing in the porcelain. Mix the porcelain a little thinner than thick cream; then, with a flat burnisher, place in enough to half fill the matrix, tapping the pan to bring the alcohol to the surface and better settle the porcelain to its place. This may be repeated until the cavity is full.

It will be found necessary to add a few drops of alcohol from time to time to both the powder and investment. Should the porcelain flow over the edges, the surplus is best removed with a small camel's-hair brush wet and brought to a point by the tongue. If this is carefully done you need not have any overhanging edges. Place the cup on the stove, and in a few minutes touch a match to the surface of the cup and wait until the alcohol is burned out.

The filling may now be baked by gradually raising the flame with the blow-pipe, which, as a rule, will take about one to two minutes. This is very much quicker than an electrical furnace.

In baking it will be noticed that the porcelain will turn gradually dark and then red, when, as a rule, it will be baked enough for the first time. It is now removed from the furnace, cooled again in the water, and after it is partly cooled the porcelain and investment are made perfectly cool with alcohol. This is repeated each time until the matrix is full.

To prevent shrinking of contour and compound fillings some have suggested the use of pieces of Ash's teeth, but a better plan is to bake a button of porcelain to be used in the case at hand, as the filling will be more homogeneous. The button is baked on a piece of platinum, the pan being filled with asbestos fiber not wet. After baking remove the button; place it in a napkin or chamois skin, and crush up into small pieces. Then place as many pieces into the cavity as can be inserted without pressure, being careful that the pieces do not come up against the edges. Place large pieces in first, then fill in with the smaller pieces of porcelain; mix the porcelain rather thin, keeping the pieces and the investment wet with alcohol. Add the powder gradually, tapping the pan each time, so as to settle the porcelain in the bottom and between the pieces; build up well, dry out, and bake. If this be carefully followed out, one can bake the largest compound fillings without fear of bad edges in three bakings. No other precautions need be taken.

Only those who may have had the experience of baking compound fillings from six to ten times, then to find that one side does not fit, can appreciate what this means in the saving of time and positive assurance of perfect success in all cases.

I now use pieces of Jenkins's porcelain in all cavities, as one large piece is equal to one baking in small cavities and three to five bakings in large ones. The same process is used in contours of front teeth.

It is not necessary to use pieces of porcelain of the same shade as the tooth or the filling, but never use a darker shade. In the final baking it is necessary to hold it at the melting point a few moments longer, but care should be taken not to go above this unless it is desired to burn the filling a shade lighter. I make a number of buttons of different shades. This saves time when in a hurry.

In baking contours of front teeth, one is sometimes puzzled to determine just how high to build a contour. This can be avoided by taking the measurement of the cavity at its widest point with a pair of architect's dividers, sticking the points through a piece of paper, and label. This can be used for future reference in adjusting the dividers in baking. After baking the second time, the contour can be measured until it is exactly correct. The baking being complete, remove the gold and polish in round edges with a Perfection cloth disk of The S. S. White Dental Mfg. Co., using the coarse grit, and finishing with the cuttlefish or pumice disks. For cutting the grooves in the porcelain filling before setting, the best instruments I have found for this purpose are the small carborundum rubber disks made by Leaming, and sold by the Consolidated Dental Mfg. Co. They come in sizes as small as a diamond disk; can be kept at a knife edge by holding the disk against the carborundum wheel; they cut faster and last longer than diamonds.

Cements.—Cement is one of the most important features of porcelain work. In simple fillings, where the walls are thick, the cement should correspond to the shade of the tooth. In contours, where the walls are thin, a cement near the shade of the tooth will show through the enamel, making it necessary to select a cement a shade darker than the tooth; or two mixings may be used in one cavity, the darker shade to line the cavity and a shade to correspond to the porcelain being used on the surface of the inlay. In this, of course, judgment will have to be used. Should the filling be lighter in shade than the tooth, a cement darker than the tooth and filling would be required, and *vice versa.* But it should be remembered that cements change the shade of porcelain in the same way that gold and platinum change the shade of Ash's teeth.

The cements most useful will be light pearl gray and pearl gray, brown, light yellow, and bluish white. The best cement for the purpose, in my experience, is Harvard.

After placing the inlay in the cavity, wipe off all surplus cement; then take a thin, flat burnisher and heat to a cherry red and press firmly against the filling. This may be repeated three or four times, until the cement is hard. Remove all the cement around the edges without interfering with them, and varnish or paraffin the filling until the next day, when, if necessary, the edges may be trimmed and polished. The Jenkins body will polish the same as Ash's teeth.

Discussion.

Dr. GEO. E. HARDY had gotten some good ideas from the paper, but would like to hear the opinion of others upon a few points, as well as to have Dr. Brewer explain his views and reasons more fully. In polishing margins, for instance, when preparing the cavity, Dr. Brewer says he uses a smooth soft burnisher and pumice stone. Dr. Hardy thought a fine-cut finishing bur would be more efficient and give as smooth a margin, especially if followed up with cuttlefish or cotton cone and pumice. A point he would like to have explained more fully is the use of alcohol. Does the doctor mix his porcelain with alcohol instead of water, or only wet the investment with it? And why use alcohol? A good idea he wished to emphasize is the use of pieces of porcelain in building up the filling, especially of the same kind of porcelain, instead of pieces of Ash's teeth. In the same line he had had better results, especially in compound cavities, in molars and bicuspids in trying in the filling after the first bake, when by forcing the filling into place, if it should be broken or cracked, remove it carefully, fill in the crack, and bake again. He would like to ask whether the slow-setting quality of Harvard cement would not be a disadvantage. When mixed thin enough to set an inlay, it will take at least an hour to harden.

Dr. F. F. **Drew** found the same trouble with Harvard cement in his experience; it would take two hours to harden if mixed thin enough for the purpose.

Dr. A. W. **Sweeny** said his experience with porcelain inlay work was so limited that he rather felt like waiting to hear from others before he stated his own views. According to his observation, there appear to be two camps of porcelain workers, one of which advocates the use of high-fusing body and a platinum matrix, the other low-fusing body and a gold matrix. Those who use the high-fusing body and platinum hold that this is the better, because you can try the filling in before baking it. Those who use the low-fusing body and gold matrix say this is not necessary. The paper states that the filling can be tried in after the first baking, and, if necessary, the shape can then be altered. The use of already baked body is an improvement. He had gone further than that, by grinding up a piece of porcelain, about as you would for an old-fashioned porcelain filling, and after making the matrix place this in the matrix and then put porcelain around it and fuse them together. There is an advantage in this, because you can be more sure of matching the color. He thought the gold matrix could be used without investing in asbestos.

Dr. C. J. **Grieves** said the literature describing the two kinds of work was very confusing. Those who favor the low-fusing porcelain say that with a platinum matrix it is not possible to make a good-shaped filling for a deep cavity, while those who use the high-fusing porcelain say that all porcelain contracts in cooling, but that the platinum matrix can be replaced in the cavity and receive a second burnishing to the walls to make the filling fit. One advantage of the high-fusing porcelain is the exactness of color obtainable. Those who use porcelain fillings by either of the methods say that there has never been a case of a filling washing out on account of faulty cement, yet much attention is given to the selection of cement. Dr. Wedelstaedt recommends Justi's Acme. Others recommend Dirigo cement or Harvard. It would be well to turn our thoughts inward and ask what assurance have we of the permanence of our gold, amalgam, and gutta-percha fillings. These all fail, and we use cement where all other materials fail. He believed the porcelain fillings were here to stay, and they would take the place of gold fillings to a considerable extent.

Dr. **Meyer** said he had used porcelain fillings for a number of years, and to a considerable extent he found Dr. Brewer's methods all right; but he did not tell how to retain the porcelain filling. It would not do to depend upon a little bit of cement. His method is to prepare the cavity so as to get a good impression that will draw out well. This is necessary, but before finally putting the filling in, the wall of the cavity and the little plug as well should be roughened a little so as to give the cement a better hold. Another way is to put a platinum pin in the filling. Cements, if the wall of the cavity and the plug are both left smooth, will not hold the filling securely. He had found Harvard cement the best of all, though it does take longer to set.

Dr. W. A. Mills said he had recently seen a porcelain filling that was put in ten or twelve years ago. If the cement used with that was good enough to hold it securely that long, it would seem to prove that there were other than the Harvard cement that would answer our purpose. The filling was put in by the father of Dr. Hoopes, and possibly she could tell what cement was used.

Dr. Hoopes said that at that time they used Justi's cement, but in her opinion it was not so good as now made as it was at that time.

Dr. Mills said he recently had to remove a filling of Harvard cement, and it was so hard that he could not drill it out. He learned that the cement had been mixed on a glass slab and worked up very fine with a stiff spatula. If, as used for porcelain fillings, it became as hard as this filling was, he felt sure it would hold the porcelain filling securely.

Dr. Sweeny said many dentists were surprised, and may be alarmed, at the results of recent investigations that prove that all cements used in filling teeth leak. Yet we all know that cements do preserve teeth, so we need not, with the abundant proof of this fact that we have, be frightened because it is proven that they leak.

Dr. David Genese said his experience with fused porcelain fillings extended over twenty years, but he had not yet seen one that in his judgment was as good as a good ground porcelain filling. He thought high-fusing porcelain was better than the low-fusing, and that the filling should be made large and then ground down to fit the cavity. To polish the surface, first rub it down on an Arkansas stone, and then polish with rouge. Treated this way the surface will be just as desired. Low-fusing porcelain will always burn light, as the colors are not of a metallic nature and will not stand the heat. The use of alcohol in mixing the porcelain was a good improvement. To get the inlay properly burned it should be pressed tight as possible into the matrix, so it will require only two burnings. He did not think putting a platinum pin in the filling would be a good plan, as the pin would show through the porcelain, and would also weaken it and possibly fracture it.

Dr. Harry E. Kelsey said he used only Harvard cement, and found the same difficulty with its slow setting that others complained of, but with this exception it is the best to be had. It is the hardest and stickiest cement he had ever used. It seems to continue its adhesion even under water. It can be mixed quite thick and will still flow, and when so mixed will set quite satisfactorily within a half-hour. Low-fusing porcelain, in his opinion, was quite as strong as the high-fusing, and would take a much finer finish.

Dr. Brewer, closing the discussion, said that polishing with cuttlefish paper disks was all right, except in places where they would not reach. He used the ball burnishers for polishing the inside of the cavity, and also used finishing burs for the same purpose. Alcohol is used in mixing the porcelain because it makes it more homogeneous, and more of it can be packed in the matrix than would be possible if water was used. He uses the pieces of the same porcelain, because they are less likely to crack than if Ash's teeth pieces were used.

To hasten the setting of Harvard cement he used a hot burnisher, placing it against the cement. In this way it can be made to set in about two minutes. The cement should be mixed a little thinner than it is for crown- and bridge-work. As to the percentage of failures in porcelain and other work, if we kept careful records we would find that about thirty per cent. of all work we do is on account of failures either in our own previous work or in that of others. He did not think the failure of porcelain fillings would exceed this average, even if it approached it.

He never tries in his fillings, and bakes about three times. He cuts grooves on all surfaces when possible, and enlarges the bottom of the cavity so as to give space for cement. If the baking is done properly, there is no possibility of burning out the color of low-fusing body.

There was no further discussion, and the society adjourned.

REPORT OF CLINICS.

Dr. C. WALLACE, of Lander, Wyoming, demonstrated the use of a "parallel detector" in the construction of crowns and bridges.

Dr. Wallace said: So much has been said and written of irregular or anomalous conditions of the teeth that it is wholly unnecessary for me to speak of them any more than to call attention to the fact that they do exist, in most cases, to a greater or less extent, with but a few exceptions, in connection with the subject at hand.

It is largely due to this unfortunate circumstance that I am about to introduce a method of crown- and bridge-work resembling in many respects those already employed, yet vastly different in result and application, intended to overcome many, if not all, of the difficulties encountered in construction and insertion, as well as the many serious objections to this otherwise highly esthetic and satisfactory form of artificial dentures.

My method is not confined to abnormal or isolated cases alone, but to all, regardless of what heretofore have been considered favorable or unfavorable conditions, assuming, of course, that sound roots are present, being based, as it is, upon certain fixed and unchangeable laws, which have been sadly and shamefully overlooked in the past, to which bad results can be readily traced; the total destruction of, I might say, thousands of sound teeth and roots rendering useless the beautiful bridges intended to be supported by them, thus causing failure of the entire procedure and explaining in a measure the retrogression in prosthetic dentistry.

It is a well-known fact that the pulp-canals of two or more teeth are scarcely, if ever, found in an exact parallel position in relation to each other, even in normal teeth in their normal position. I will take for example the two upper cuspids and central incisors, and there are others, but none so desirable or more often used in this class of work.

The cuspids are said to be in normal position when the labial surfaces of their crowns are in a perpendicular line with the face, parallel with the crowns of the other teeth, their roots converging upward, inward, and backward, the pulp-canals in the center; while the roots of the centrals diverge upward, outward, and backward.

FIG. 1.

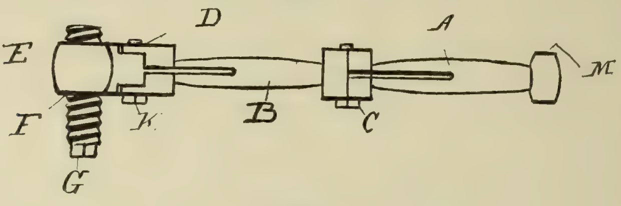


FIG. 2.

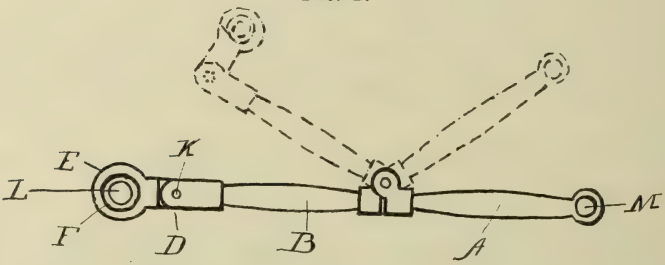
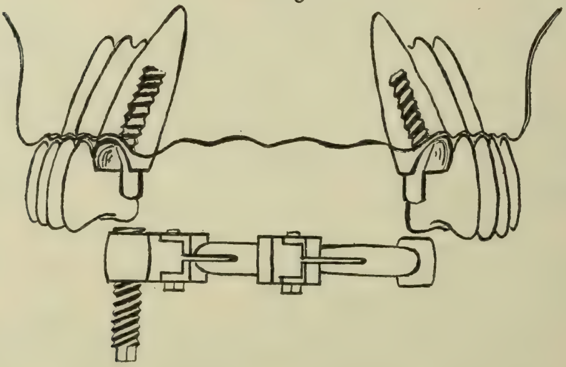


FIG. 3.



By glancing at Fig. 4 it can readily be seen that it would be utterly impossible to ever find these canals exactly parallel, to say nothing of the conditions found when the temporary cuspids or laterals have been prematurely removed. It is almost invariably the rule in cases presented for bridge-work to find the remaining teeth in abnormal condition, as shown in Fig. 5.

When a bridge is all that it could and should be, it must necessarily possess the following requisites: Applicability, durability, attachability, and removability, as well as hygienic and esthetic features. To be applicable the canals and posts must be parallel, because it is contrary to all the laws of mechanism for two or more bodies fixed at different angles to enter with accuracy two or more recesses or bores fixed at different angles, as shown in Fig. 6. To be strong and durable, the precious metal should be used, on account of the chemical ability to resist the acids of the mouth and rigidity to withstand the force of mastication. To be attachable, metallic post, matrix, and bands should come in direct contact with solid tooth-structure all along the walls of the canals and across the face of the root, to prevent the slightest friction in any direction. To be removable, no adhesive material of great strength should be used.

FIG. 4.

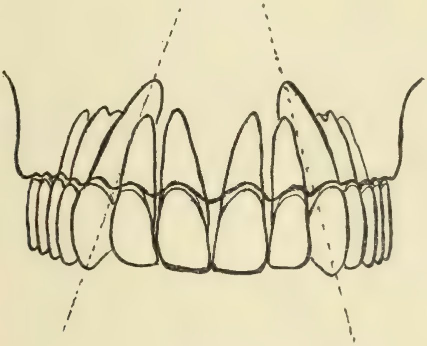
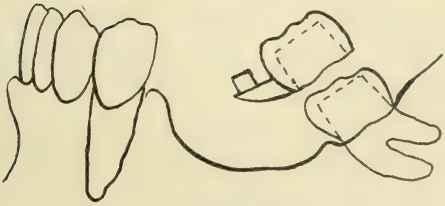


FIG. 5.



The reasons why a bridge should be detachable are many:

First. If it is true that the natural teeth should be cleaned thoroughly at least twice a year, why does the rule not apply to artificial ones? It does, but the operation of cleansing and repolishing a bridge of any considerable size in the mouth is next to impossible.

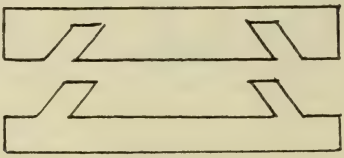
Second. If all beings of the animal kingdom require periods of rest, why does the rule not apply to the root of a single tooth, doing the work very often of three, two beside its own? It does, but when bound in slavery by a permanent and persistent oppressor the sick and diseased root must continue to bear its burden without medical aid, assistance, or relief until its function and usefulness are forever lost, many years too soon.

Third. Unavoidable accidents will happen; therefore bridges, no matter how well made, often need repair, which, of course, as a rule necessitates their removal, sometimes by their complete destruction. To be hygienic the denture must be tasteless, odorless, and otherwise harmless, and in order that this may be it must be free from cracks, crevices, or pockets to receive and retain food, moisture, or gases.

To be esthetic there should be no gold or other metal visible. In attempting to construct a bridge endowed with the stated qualifications for the case shown in Fig. 3, and avoiding the difficulties mentioned, I proceed substantially as follows:

After placing the dam in position, the natural crown is excised, pulp removed by the use of local obtundents, canal treated and filled at the apical foramen, all in the usual way. After treating the root, and cleaving the enamel from the side, a counterbore is made with a cone bur in the canal. A twist drill is next applied to enlarge the canal to a desired size and depth, and threaded with a tap. The post is now threaded and partly severed at a point near the bottom of the counterbore, placed in the root, bent backward until it rests firmly against the posterior wall of the counterbore, to allow room for the porcelain facing. The post is now marked with a sharp instrument at the top of the counterbore, on the side toward which it is desired to again bend it. The post is removed and partly severed at the point indicated by the scratch, and reinserted in the root, as shown in Fig. 3.

Fig. 6.



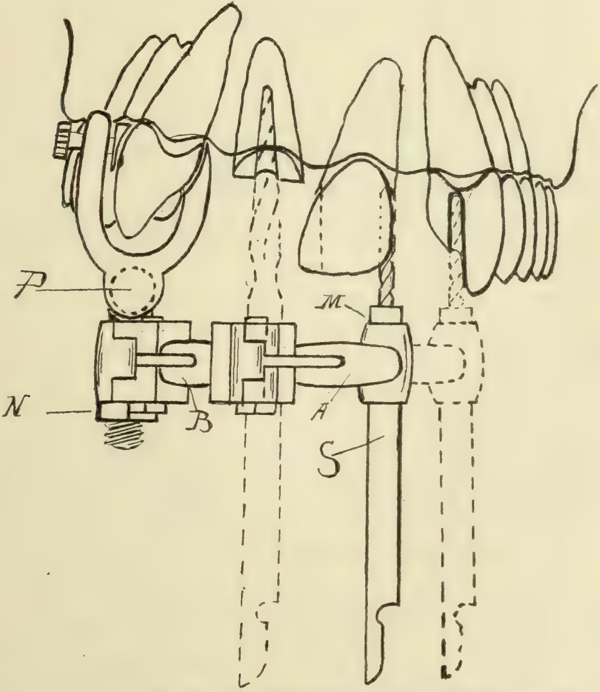
After all the teeth or roots intended to be used in the bridge have been treated thus, comes the act of bringing the projecting bodies of these posts into an exact parallel relation. The condition is now easily reached by the use of my invention, called a "parallel detector," a complete description of which will most likely be proper at this time. Its purpose, as suggested, is the gauging and correcting with accuracy the non-parallelism of canals, or the projecting bodies of posts, such as I prefer to use.

Fig. 1 is a rear or knuckle view of the instrument. Fig. 2 is a plan of the same, showing another position in dotted lines. Fig. 3 is a view of the device in operation, showing the mode of application. Fig. 7 is a modification, showing an attachment to be used when it is desired to parallel the canals, or to drill holes in the sides of the natural crowns for the application of any of the well-known artificial crowns.

In such cases the screw clamp is adjusted to the adjoining teeth, and the angle of the teeth approximated by turning the instrument in the ball-and-socket joint shown at *P* and tightening the nut *N*. The drill *S* may be passed through the bore *M*, and arms *A* and *B* swung to any desired point.

A and *B* indicate two arms perfectly straight, which arms are hinged or jointed together, as at *C*, Fig. 1. The joint is of such character that the two arms can only swing to a right line in one direction, but may close together in the other, such a joint being common. One of the arms, as *B*, has a joint *D* therein, and a short arm *E*, with threaded socket *F*, in which socket a threaded bushing, *G*, may be screwed up or down, with bore, *L*, in the center. The socket in arm *E* extends in the same general direction as the pintle of the joint *C*, and pintle *K* of joint *D*. The recess or bore in piece *G* will thus at all times be parallel with bore *M* in arm *A*, while the ends of the arms may be swung to any desired position within their reach. The joint *D* gives greater flexibility, enables the recesses to be brought to different positions with facility, and allows a rotary movement in removing the instrument without danger of losing the correct position once it is obtained.

FIG. 7.



When the faces of the roots are not in the same plane, stud *G* can be advanced more or less, as one is above or below the other.

It would be apparent that, while the instrument is adjustable to various positions, the recesses or bores in the arms will remain parallel as long as the joints are good. Said recesses or bores are provided with bushings, with holes therein to accommodate the different-sized drills and gauges of wire for construction of posts. The arms *A* and *B* are slit in a horizontal direction to make an elastic knuckle joint, which, by tightening pintles *C* and *K*, become fixed, transforming the instrument into a datum for testing the accuracy of impressions.

To return to the bridge in course of construction. For the case shown in Fig. 3 the bore in the end of either arm is placed over one post, which is bent to a desirable position. The instrument is removed and the other end placed on the opposite post, which is in turn bent until the first post will re-enter. The instrument is again removed; posts are now unscrewed, a little solder being allowed to flow into the cuts, which should not be deep enough to render the posts so weak at these points as to allow them to change their form in removing. After soldering, the screws are coated with chloropercha, placed in the roots, and held in their proper and permanent position by placing the "detector" upon them until the evaporation of the chloroform. After removing the instrument surplus gutta-percha is taken out of the counterbore; a band is made as for a Richmond crown, of pure gold, 30 gauge. A tube is made, of platinum plate rolled exceedingly thin and double the length of the exposed post, by rolling the plate twice around the wire from which the post was made. Partly remove the wire, clip the end of tube to a bevel with shears, and force back on the wire.

Puncture a hole in another plate or disk of pure gold 34 gauge, through which pass the tube, with wire inside, until the disk is about the center. Remove all from the wire, and place on the post with the point of the bevel toward the bottom of the counterbore. With a small round burnisher press the disk well up into the counterbore around the post and over the face of the root. A small quantity of hard wax is placed in the depression, and melted by applying a warm instrument, to join the tube and disk, which are removed and placed back on the wire where the disk can be trimmed a little larger than the root. After placing the tube and disk again in position the band is forced over the root, folding the edge of the gold disk between the root and band, which is stoned down flush with the disk on the labial surface, leaving the palatal or lingual surface extended. The tube is closed by squeezing that portion extending beyond the end of the post with pliers.

Having treated both teeth alike, we are now ready for the bite and impression, which can be taken simultaneously.

Before pouring model, the impression can be tested by placing in the matrix two small pieces of wire from which the post was made, and placing the detector upon them. If they fit, we are sure that the caps have not changed their position in the act of removing from the mouth. The wires are removed, matrix and cap coated inside with marble-dust to exclude all solder, and strengthened with wooden posts. Model poured in the usual way.

It might be better in some cases to solder the cap and tube before taking impression, but generally a little hard wax is sufficient, as the final soldering will do it all at one time. The teeth are now set up, and I have found it advantageous to place a heavy platinum wire just above the pin line, extending from post to post, shaped to conform with the arch. This gives greater rigidity, lessens contraction, and facilitates the heating of the solder on the mesiolingual surfaces of the crowns, forming a protuberance through which the hole is made with a twist drill of suitable size to receive the set-screw. This hole, however, is not tapped until after the bridge has been placed in the mouth and the drill extended into the post. For this operation it is best to use a small round drill, so shaped at the point as to go a certain distance and no farther, as it is only necessary for the end of the set-screw to enter a depression in the post. To facilitate the drilling of this hole in the bridge, entering the matrix at a desirable point, it is a good plan to make a small tube of platinum, filled with graphite or marble-dust, and pass it through a puncture in the side of the band extending below the disk, or by placing the tube through a hole in the end of the heavy platinum wire. All that is necessary, when the bridge is soldered, is to ream the hole to the desired size. The set-screw is the last made, and should be cut with a very close thread, and deep slot in the end extending beneath the surface of the finished bridge, polished with the set-screws in position.

FIG. 8.

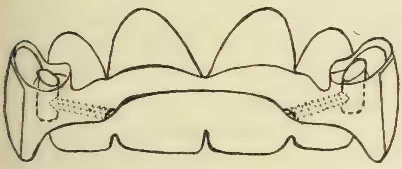


FIG. 9.

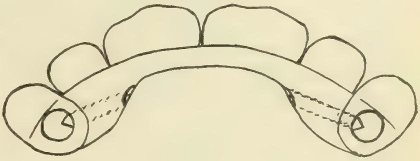
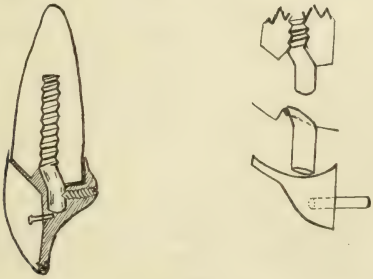


FIG. 10.



In order to know just how far in the screw should go a depression is made in a piece of wire, and the wire made to occupy the position of the post while the last grinding and polishing is being done.

In forming this crown to be used singly I usually place the set-screw in the center of the enamel protuberance, which I build out a little more prominently than is found in nature, to which no objection could be offered, to make room for a screw of suitable length. (See Fig. 10.) But in bridges I bring it round to the lingual surface of the adjoining dummy, where I can make it as long as I desire. (See Figs. 8 and 9.) If the metal in the process of soldering has contracted to such an extent as to prevent the placement on roots, I prefer to bring this slight regulation about by placing rubber bands on the post and dismissing the patient until the next day, when this obstacle will be overcome. You will note that there is not a place in this crown or root, below the superior end of the post, where solid metal is not in direct contact with either solid metal or solid tooth-structure, thus preventing all friction.

To insert the bridge, now finished, as shown in Figs. 8 and 9, the set-screws are withdrawn only enough to allow the removal of the wire; the posts and end of roots are thinly coated with chloro-percha, for the purpose of making the joints air and moisture-tight, no strength being required of the adhesive material. The piece is warmed, sent home, and set-screws tightened. It will now be apparent that what was an unfortunate circumstance has now become a decided advantage, as it would be just as difficult to remove this bridge with posts attached as it would be to insert it, the canals being at different angles.

My procedure in adapting this crown to bicuspids and pulpless molars is substantially the same, but to live molars in good condition I modify it by soldering a wire, about 10 or 12 gauge, to the mesial surface of an all-gold crown at the gum-line, partly severing and bending it toward the occlusal surface, at a point near the center of the adjoining dummy. Pass the upright portion of the wire, which has been bent to the proper angle, through a gold plate bent to a right angle, until the plate rests on the horizontal portion of the wire. The lower and inner side is now filled in with solder under the plate, which I have allowed to extend around to the lingual surface. I now grind this to slope away from the gum toward the bottom of the vertical post. The crown can now be cemented into position and the work proceeded with as in other cases, or it can be left uncemented until the completion of the bridge.

A platinum frame for porcelain bridge can be constructed in very much the same way.

Dr. H. E. Kelsey exhibited specimens of porcelain crowns. These crowns were made and exhibited both to show the extensive character of the work which can be done with the modern low-fusing porcelain body, and to present some ideas which may prove to be as practical as they are novel at the present time.

Of these two crowns the first consists of an accurately-fitting cap of 34 gauge pure gold adapted to a bicuspid exactly as would be done for a shell crown, except that the metal over the grinding-surface is burnished down as close as possible, as is also the band; and soldered with 18 k. gold plate, which was secured of Mr. James Hart, of this city, and which has the quality of retaining the color perfectly during the subsequent baking.

Over the entire surface of this cap Consolidated low-fusing inlay body was baked, so as to entirely restore contour given the tooth before the grinding, which is always necessary before a shell crown is fitted. The result is a porcelain shell crown without a particle of gold showing.

The resistance of this crown to the strain of mastication is probably not so great as an all-porcelain crown, but it possesses the advantage that it can be placed on a tooth with a live pulp, which is often very desirable, especially on the anterior teeth.

The metal cap, which is in this case made of gold, can be made of platinum soldered with pure gold.

The second crown may be briefly described as an all-porcelain crown constructed on a gold or platinum base like a pivot tooth, or with gold or platinum cap like a Richmond crown. After the cap and post have been fitted and soldered together, leaving the post projecting as far from the end of the root as the bite will admit of, the porcelain body is built up and baked to form the crown just as a porcelain contour filling is made.

The advantages of this crown are its perfect adaptation to the end of the root, its strength, which exceeds that of a porcelain crown, from which the glazing has to be ground to secure the joint with the end of the root and occlusion, and the assurance of perfect articulation, no matter how irregular the case may be.

These crowns required only four bakings in a McBrair electric furnace. In many cases three bakings would be sufficient.

Dr. J. C. UHLER exhibited forceps designed to hold a block of artificial teeth which has portions of rubber adhering to the pins after removal from a plate. By a clamping device the block is held firmly, so that it may be heated and the rubber removed with a suitable instrument.

Dr. H. S. ABENDSCHEIN showed a method of making anterior crowns. He first takes an impression of the front teeth, and from this cuts out the tooth corresponding to the one to be crowned, and with wax and plaster builds this up to the shape he wishes the crown to have when finished. The tooth so prepared is now varnished, and when the varnish is dry is rubbed with soap lather, as usual. He next places the rubber ring that comes with Melotte's apparatus on a slab of glass, and filling it with plaster, mixed thin, presses the prepared tooth into the plaster so as to get an impression of one-half of it. When the plaster is hard the tooth is removed and the impression soapstoned, and the tooth replaced. The rubber ring is then placed over the impression so as to extend above it as far as possible and yet remain in place, and filled with soft plaster as before. When this plaster is hard the two parts of the impression are separated, and both halves are brushed with powdered soapstone. Now replace the rubber ring on either half and press Melotte's moldine into the impression. Remove the plaster impression and pour Melotte's metal on this, and you have the die to swage one-half of your crown on. The die for the other half is made in the same manner from the other half of the plaster impression. Swage of 22 or 24 k. gold for the outside and 22 k. for the inside, 28 gauge or thinner if you prefer, and cut away from the neck portions to admit the root to be crowned, and trim off the excess of plate and wire together carefully so that the edges will be in close contact, and solder; enough solder should be placed at the cutting-edge to strengthen it. Now grind off the surplus edges of the shell, and polish it and shape the neck of the crown so it will fit up under the gum, and cement in place.

Dr. C. E. DUCK showed a method of making partial lower dentures. He said the importance of strengthening partial lower plates without making them too bulky is patent to all, and expense is a consideration that must be kept in mind; therefore gold or platinum and iridium cannot enter largely into their construction. As he cannot reconcile himself to cut off sound teeth in order to make bridges, he makes many partial dentures according to the following method: Either take two impressions, or else take an impression from the plaster cast. On the second model thus obtained make a wire frame of platinoid fitted closely and accurately, allowing it to extend nearly to the heel of the plate; here turn the wire at right angles and allow it to rest upon the cast. This is done to prevent its being depressed in packing. Now form clasps, preferably of platinum and iridium; place them in juxtaposition with the wire frame, and solder on the model with gold. Remove and place the whole fixture upon the model to which the teeth are to be placed. The wire should be nicked and gold-plated. The whole thing can be made in half an hour, and will be found to be a plate light, strong, and durable.

Dr. GORDON H. CLAUDE showed a method of making a matrix for compound approximal cavities, as follows: Take a thin ribbon saw, fold over a portion, about the depth of the cavity, and snap it off by pressure between the thumb and forefinger. This gives a slight deflection at the broken edge that serves well to fit close to the cervical margin just below the floor of the cavity, and is passed down, being guided by the surface of the tooth until just below the floor of the cavity, at the same time cutting off any growth of gum that may overhang the cavity. This is adjusted and held in place by separating rubber, gutta-percha, or Gilbert's stopping, which serves admirably as a compress to arrest troublesome hemorrhage in cavities extending below the gingival surface, and where it is impracticable to use the rubber dam. Frequently it is a great aid in the preparation of the cavity to place the matrix in position before excavating. The rubber holding the matrix in place has the advantages over a hard resisting medium in that by its compressibility it admits of securing any desired contour, and of allowing that nice surplusage along the margins of the cavity so much desired in giving a nice finish. The degree of contour and of surplusage can be determined and regulated by the force and direction of the blow or pressure. By drawing the temper of the steel to blue, the matrix may be given any desired shape by manipulation with the fingers and trimming with scissors. For cement fillings aluminum serves better, as the cement does not adhere to it.

Another method is by the use of metallic polishing strips. These were passed around the tooth and the two ends pinched together with pliers, folded twice, and bent down against the tooth and tightened where necessary by wedging with wood or gutta-percha.

In connection with the use of rubber here, the clinician also called attention to what seemed an advantage in the use of the hand mallet and plugger. A rubber hood made of several layers of dam is tied on the plugger. This seemed to him to hasten the recoil, permitting a more rapid use of the mallet and at the same time (deadening the sound so disagreeable to many patients) apparently softening the blow.

Dr. JAMES E. WYCHE, of Greensboro, N. C., described a method of extracting difficult roots of teeth without touching the gum, tearing the process to pieces, or breaking the root with the forceps, by using the W. Storer How screw system. For instance, to extract any of the upper straight-rooted teeth he takes a nerve broach and finds the pulp-canal, which he enlarges by the use of a small round bur about No. 3 or 4, drilling deep enough to get into the solid dentin. He then takes the smallest size tap, AA, fastened in drill chuck and cuts the thread with the hand, not using too much force. If the thread thus formed seems to lack the necessary strength the tap A can be used, followed by tap B if still more strength is needed. Then by use of the screw-post chuck the screw is inserted, and the tooth can be readily extracted by the use of the ordinary flat-nose pliers.

If the root is in the lower jaw, use the right-angle burs to enlarge the canal just as in the upper jaw; take the right-angle tap with the short hub, and proceed as in the upper jaw. The tooth in front may be used as a fulcrum.

It is astonishing how easy it is to extract almost any root in the mouth, and with very little pain. It is undoubtedly the best method to extract most difficult roots.

The same screw-posts can be used to great advantage to retain gold or amalgam fillings where sufficient undercut cannot be gotten to hold the filling.

Dr. CHAS. W. KAMMER showed a method of replacing broken facings on Richmond pivots. This method in construction is very similar to a porcelain facing on any gold crown. The projecting pins from the broken-off facing are ground down even with the backing, and the backing ground down about one-half from the incisive end, and also the sides to a small extent. About one-half of the band on the labial aspect is ground away, allowing the root to be exposed to view. A measurement of the root is taken, and a cylinder constructed to cover the posterior band and backing and the exposed root. The lingual surface is burnished to the backing. A tooth is now selected to fit the vacant space and backed and soldered to the band; the sides of the original backing are now serrated and the crown cemented into position.

Dr. G. MARSHALL SMITH exhibited a model of a lower jaw showing an appliance for retaining loose teeth. The appliance was made by burnishing a strip of very thin 24 k. gold plate about three-sixteenths of an inch wide to the labial face of the teeth from cuspid to cuspid. A similar strip was then burnished to the lingual side of the same teeth; the strips are now carefully removed from the model, and the part next to the model invested and gold solder flowed over each strip sufficient to make it stiff and rigid. The strips are next replaced upon the model and holes drilled through each strip from the labial side, to allow three screws to pass between the teeth,—viz, between cuspids and laterals, and between the centrals. The holes in the labial plate are smooth and countersunk, while those in the lingual plate are tapped to receive the thread of the screw, which is made with tapering shoulder to fit the countersinks in the labial plate. The two little strips when adjusted to the teeth and screwed together brace and hold them very firmly.

Dr. DAVID GENESE exhibited a simple and easily made matrix, which can be left on a tooth till the next visit of the patient. He prepares strips of metal of proper width and tins them. When he wishes to make a matrix he takes one of these strips and adjusts it around the tooth, not too tightly; then moistening the ends with soldering fluid he presses them together with a pair of pliers, and holds them for an instant in the flame of the spirit lamp. This solders the ends together, and the matrix is complete. It is now put on the tooth and pinched tight with the pliers and tied with floss silk, the ends being folded down out of the way. If amalgam is to be used the inside of the matrix should be touched with solution of soap, or just a suggestion of glycerol, to prevent the amalgam from fastening the matrix on the tooth.

Dr. A. P. GORE showed a quick way of adjusting a tooth to celluloid or vulcanite, applicable to plates from which one or more teeth or a block are broken. He first cuts with an engine bur a well-defined mortise or groove, with deep undercuts in the plate to receive the pins of the tooth or block to be replaced, and fills the mortise and undercuts with fusible metal. Then holding the plate wrapped in a napkin in the left hand, with a pair of pliers in the right hand the tooth is held near the flame of an alcohol lamp, while an assistant holds a blunt instrument in the same flame. When the instrument is heated it is placed upon the metal in the groove cut in the plate, which instantly is melted, and while in that condition the warm tooth with heated pins is pressed home. Firm pressure should be continued while the metal is cooling, to prevent shrinkage while cooling.

The result is a tooth or block firmly attached to the plate, and is especially suitable for emergency cases.

DENTAL SOCIETY ANNOUNCEMENTS.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS, AUGUST 8 TO 14, 1900.

GENERAL CIRCULAR, JANUARY, 1900.

DEAR SIR AND ESTEEMED CONFRÈRE,—We have the honor to remind you that in conformity with the decisions already reached, and of which you have been informed, a Dental International Congress has been arranged for to take place in Paris, from Wednesday, the 8th, to Tuesday, the 14th of August, 1900, inclusive, during the Universal Exposition of 1900.

In the name of the Committee of Organization appointed by the General Commissary of the Exposition, we renew our invitation to you to take part in this Congress, in which will be discussed most important questions concerning the study and practice of dental art. By the present circular will be seen the considerable extent to which the interest in this Congress has now reached, due to the co-operation of large foreign professional associations, such as the British Dental Association for England, the National Dental Association for the United States, the Central Verein Deutscher Zahnärzte for Germany, and likewise of the national associations of Spain, Switzerland, Holland, Belgium, Japan, etc. The foreign national committees that these bodies have now formed are therefore the direct emanation and the regular representatives of their respective countries, just as the Committee of Organization of the Congress is the emanation of the French professional societies. It results from this organization that the great corporate demonstration of 1900 will be a complete and regular presentation of the dental associations of the New and the Old World, and that consequently the matters discussed will be such as are engaging the attention and constitute the aspirations of the entire dental world.

You will find appended to this circular the list of subjects which will constitute the matter of the reports of sections according to the programs distributed in advance; also a list of proposed subjects to be more specially treated, and on which the committee, counting upon your aid, desire to invite communications; finally a list of the foreign colleagues already invited to either take part in the discussions or to conduct demonstrations. These various documents will show you, we trust, the interest that this International Dental Congress will have for the entire dental profession, following closely, as it does, upon the Paris Congress of 1889, and the Columbian Congress held in Chicago in 1893.

First and foremost, we must call attention to the new arrangements, the adoption of which has been rendered necessary by the development made by the great professional manifestation of 1900.

The Committee of Organization found itself forced to divide the work, by reason of its importance, and to increase the number of their collaborators. With this end in view, it has united in a Committee of Patronage and Propaganda, the greater part of the members of the body who have acquired some celebrity in the practice of the dental art. Besides the valuable help thus brought to the active organization of the Congress, this committee has the mission to group the efforts of its adherents, to recruit new members, and to lend its aid to the central commission in the sphere of action, and according to the means at the disposal of its members. On the other hand, in order to apply the principle of division of labor to the preparation of the Congress, as best adapted to secure the combined utilization of individual help, it has been decided to divide the organization into three principal parts. Consequently the administrative organization has been confided to several committees, such as the Press Committee, the Finance Committee, the Committee of Control and Credentials, the Committee on Transactions, etc.

Scientific organization is assured by the care of these committees, which, after having divided into eleven sections the total number of questions which are to be studied, will proceed each to an examination of the matters in one of these sections.

Finally, the organization of receptions is allotted on the one hand to a general committee, which will take care of all matters relative to receptions, reunions, fêtes, etc., and on the other, to foreign sub-committees composed of colleagues speaking more than one language, and who will make it their business to be in communication respectively with colleagues of a particular foreign country in order to assist them in regard to the journey and their stay here. The general reception committee will occupy itself with the material details connected with the traveling and the stay in Paris of the members of the Congress coming from the provinces or from abroad. The commission has endeavored, in fact, to facilitate the foreign and French attendants at the Congress in obtaining the means to take part in the reunion in Paris, notably in soliciting a reduction of rates from the railroad companies. A future circular giving the necessary particulars on this point, and likewise containing the completed programs of the work to be accomplished by the Congress, as well as the receptions, etc., arranged for, will be sent to all colleagues who have applied for membership up to the date of its issue. Members of the Congress will also participate in the advantages accorded to delegates from their respective governments, the national committees, academies, and scientific societies, or persons individually admitted to take part in the official Congress.

Following another order of ideas, and to assure both a more energetic advertisement and a more effective centralization of the works offered to those coming from abroad, national committees have been instituted in most of the different countries. With this object in view, the Committee of Organization addressed itself to societies, schools, and professional gatherings, and invited them to establish a committee to serve as the authorized medium between the national and central administrations of the Congress. This appeal has been responded to, so that there now exists in each of the principal nations a national committee, its members being appointees of authorized professional societies, and being invested with the following rôle: "Each committee is essentially invested for its nation with all the powers that are conferred in France upon the Committee of Organization. It is therefore responsible for the publication of information; it is the center for subscriptions and memberships, examining the latter and rendering them valid; it ratifies the nomination of delegates, proposes members eligible to form part of the honorary bureaus of the Congress and the sections, and collates the communications offered, etc. On the other hand, as being qualified intermediary between its committees and the Committee of Organization, they are in constant communication with the latter.

We believe that this double organization will permit us, both as to France and also to foreign countries, to obtain the best possible results from the efforts for the common good which we have proposed to ourselves, and to carry out which we solicit your aid. Therefore, we beg of you, dear sir and esteemed colleague, to kindly sign and return to us as soon as possible the bulletin of membership herewith, addressing it to the treasurer of the Congress before the first of July, 1900. This adhesion will not be of definite validity till after the payment of twenty-five francs for the titulary members, and of fifteen francs for the participant members.

In order the better to disseminate information concerning the approaching opening of the International Dental Congress, we particularly request those of our colleagues who edit dental journals or who are members of an association or dental society, to kindly give all possible publicity to this circular and to the documents attached. We should be greatly indebted to the directors of dental journals if they would kindly insert this circular and recommend to the attention of the profession a matter which is of interest to all practitioners.

Please accept, dear sir and esteemed colleague, the assurance of our most devoted sentiments.

THE COMMITTEE OF ORGANIZATION.

ADMISSION TO THE CONGRESS.

In order to become a member of the Congress, please fill in the inclosed bulletin, add your visiting card, and send it, for France, under closed and duly stamped envelope, to Dr. Sauvez, Secretary-General, Rue St. Petersbourg 17, and for foreign parts, to the secretary of the national committee of the particular country to which the member belongs. The amount named must be at the same time remitted, if for France, to Monsieur Viau, treasurer, 47 Boulevard Haussman, Paris, and if for foreign countries, to the treasurer of the respective national committee. Every member of the Congress desirous of being inscribed in order to present a paper or to take part in the discussion of one of the subjects of the programs, must address his request to the Secretary-General.

EXTRACT FROM RULES.

Article 2.

The right of admission is fixed at twenty-five francs for titulary members, and fifteen francs for participant members. The members of the Congress will have the right to all the advantages of the Official Congresses. The titulary members will only have the right to the volume of transactions. The dentists and dental dealers can only be admitted as titulary members.

Article 5.

The members of the Congress who desire to present a paper are requested to notify the Secretary-General three months before the opening of the Congress. They must add to such notification the text of their communications containing a summary of their labors. The commission will have these conclusions translated into French, English, German, and Spanish.

Article 6.

The Congress will be divided into several sections. 1. Anatomy, Physiology, and Histology. 2. Special Pathology, Bacteriology. 3. Operative Dentistry and Special Therapeutics. 4. General and Local Anesthetics. 5. Prosthesis, Dental Orthopedia and Facial Restorations. 6. Teaching and History of the Dental Art. 7. Legislation, Jurisprudence, and Ethics. 8. Hygiene and Public Dental Service. 9. Practical Demonstrations of Prosthesis. 10. Practical Demonstrations of Operative Dentistry. 11. Various Practical Demonstrations, Fitting-up of Dental Offices and Laboratories, Electrical Appliances; also Dental Book-keeping.

Article 7.

The work of the Congress will comprise, first, communications which will be of two kinds,—*(a)* papers proposed in advance by the Committee of Organization and constituting the order of business; (*b*) the others chosen *ad libitum.* The communications are to be in French, English, German, Russian, Italian, or Spanish. Second, the practical demonstrations (operations in operative dentistry or dental prosthesis, and exhibits of new instruments).

Article 14.

To become a titulary member of the Congress, one must possess the legal right to practice in his own country. He must practice ethically, that is to abstain from all advertisement and all acts contrary to professional dignity. He must be accepted by the national bureau of his respective country if one exists, otherwise by the bureau of the Committee of Organization.

ARTICLE 15.

The wives of the members of the Congress, students in dental surgery, physicians, pharmacists, chemists,—in short, all persons not practicing the dental art,—can be admitted by the bureau of the Committee of Organization upon a special request as participant members.

RELATION OF THE INTERNATIONAL DENTAL CONGRESS OF 1900 TO THE EIGHTEENTH INTERNATIONAL CONGRESS OF MEDICINE, 1900.

In various foreign journals we have seen it stated by several writers that dentists are eligible to the Stomatological Section of the International Medical Congress for 1900, in which they are to be recognized to a certain extent. This is inexact; the fact is, the rules of the eighteenth International Congress of Medicine read as follows:

"ARTICLE 2. Those who are eligible as members of the Congress are,

"First. Doctors of medicine who make application.

"Second. Men of science (*Savants*) who may be presented by the French Executive Committee or by the foreign national committees."

Admitting even that it is possible, thanks to the second paragraph of the article, to admit certain eminent persons, it seems to us that the term "scientific men" (*savants*) could not be made to comprise the immense majority of dentists, who are emphatically practitioners. For if so the rule would not be observed, could not be entertained for a moment. Moreover, we glean from a circular sent to those interested in the Medical Congress, the following passage which is specific upon this point:

"We draw your attention to a question on which we have been interrogated by several national committees,—namely the admission, as members of the Congress, of dentists who are not provided with a medical diploma or that of medical practitioner. We should be happy to have been able to respond favorably to the questions put to us on that subject. Two considerations, however, prevent our doing so. First, we believe it necessary that our Congress should maintain its essentially medical character, and should admit as members only those having similar scientific authorization. On the other hand, we fear lest the indiscriminate admission of all dentists should bring a considerable numerical increase of members, which would add still more to the already great difficulties of organization. Such are the reasons upon which we decided to admit as members of the Congress only such dentists and stomatologists as are provided with a diploma of doctor of medicine. Please to accept, etc. "A. CHAUFFARD,

"Secretary-General of the Congress."

These two extracts show clearly that the door of the International Medical Congress is closed to dentists who are not also physicians.

NATIONAL DENTAL ASSOCIATION.

THE meeting of the association, which was to have been held June 26 at Old Point Comfort, has been changed by vote of the members to Tuesday, July 10. Reports from officers of Sections indicate that we shall have a very high order of work done at this meeting. Men have been selected to write papers because of their peculiar fitness for the undertaking, and enough of those invited have accepted to insure a full program. A special feature of the meeting will be clinics, under the supervision of Section III. It is hoped that it will be as largely attended as that of last year at Niagara.

MARCH 21, 1900. B. HOLLY SMITH, *President.*

KENTUCKY STATE DENTAL ASSOCIATION.

THE thirtieth annual meeting of the Kentucky State Dental Association will be held in Louisville, beginning May 29, 1900, at 9 A.M., and continuing three days.

PAPERS.

"Some Advantages of Non-Cohesive Gold, Tin-Gold, and Tin, considered from an Operative and Prophylactic Standpoint." Dr. J. R. Clayton, Shelbyville, Ind.

"Amalgam. Its Preparation, Instruments, and Instrumentation in Filling Teeth." Illustrated by models. Dr. W. E. Harper, Chicago, Ill.

"Oral Manifestations of Syphilis." Dr. T. C. Evans, Louisville, Ky.

"X Rays in Dentistry." Dr. L. E. Custer, Dayton, Ohio.

Subject to be given. Dr. S. A. Donaldson, Lexington, Ky.

"Malaria as a Cause of Secondary Hemorrhage in Extraction of Teeth." Dr. J. P. Shaw, Russellville, Ky.

"Orthodontia." Illustrated by lantern. Dr. C. DeWitt Lukens, St. Louis, Mo.

"Orthodontia." Dr. E. D. Rose, Bowling Green, Ky.

"One of the More Especial Duties of the State Dental Association." Dr. J. L. Sutphen, Greensburg, Ky.

"Care of Deciduous Teeth." Dr. J. F. Meadors, Columbia, Tenn.

Subject to be given. Dr. I. B. Howell, Paducah, Ky.

"Dental Education." Dr. Theo. Menges, Chicago, Ill.

"Practical Dentistry." Dr. E. T. Barr, Bowling Green, Ky.

"Troublesome Cases in Bridge-Work,—viz, Converging Teeth, Broken Facings, Malocclusion," etc. Dr. U. D. Hulick, Cincinnati, Ohio.

"Teeth." Dr. W. S. Williams, Uniontown, Ky.

"Metallo-Plastic Work, and Backing Porcelain Teeth with Gasoline." Dr. R. C. Brophy, Chicago, Ill.

"The Status of Mechanical Dentistry. Is it to Become a Lost Art?" Dr. O. G. Wilson, Franklin, Ky.

"Disease of the Antrum." Dr. Adolph O. Pfingst, Louisville, Ky.

"The Reproduction of Gum-Tissue in the Interproximal Space." Dr. Geo. T. Carpenter, Chicago, Ill.

Subject to be given. Dr. J. H. Baldwin, Louisville, Ky.

Subject to be given. Dr. A. H. Peck, Chicago, Ill.

"The Importance of Proper Physical Diagnosis in the Practice of Dental Surgery." Dr. J. Y. Crawford, Nashville, Tenn.

"Gold Filling *vs.* Gold Crowns." Dr. W. T. McLean, Cincinnati, Ohio.

"Antiseptics and Disinfectants." Dr. Geo. W. Cook, Chicago, Ill.

"What Efforts are We Using to Better the Profession?" Dr. M. H. Dailey, Paris, Ky.

"Cast Aluminum Dental Plates." Dr. Willard Streetman, Cleburne, Texas.

Clinics will be given by a number of prominent operators, and twelve firms have secured space for displays.

The committee are making strenuous efforts to make this the best meeting ever held in the state. Members of the profession are cordially invited.

F. I. GARDNER, D.D.S., *Secretary,*
213 W. Chestnut street, Louisville, Ky.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

In consequence of a contemplated new movement by the association, with the probability of considerable benefit both to the state boards and the more advanced colleges whose educational standards are high, the secretary most earnestly requests from the officers and members of the several state boards in the United States and Territories, a new list of officers and members.

An early compliance with this request will be most heartily appreciated.

Charles A. Meeker, D.D.S., *Secretary.*
29 Fulton st., Newark, N. J.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

The thirty-second annual meeting of the Dental Society of the State of New York will be held in the New Centennial Hall, corner Lodge and Pine streets, Albany, N. Y., May 9 and 10, 1900.

PROGRAM.

President's address, F. Le Grand Ames, D.D.S.

Correspondent's report, R. Ottolengui, M.D.S.

Report Committee on Practice, H. D. Hatch, D.D.S.

Essays by F. J. Capon, D.D.S., Toronto; Joseph Head, D.D.S., Edw. C. Kirk, D.D.S., Philadelphia; S. B. Palmer, M.D.S., Charles H. Barnes, D.D.S., Syracuse; Milton F. Smith, D.D.S., New York.

F. Le Grand Ames, D.D.S., *President.*
W. A. White, D.D.S., *Secretary.*

OKLAHOMA DENTAL ASSOCIATION.

The eighth annual meeting of the Oklahoma Dental Association will be held in the Grand Avenue Hotel, Oklahoma City, May 1 and 2, 1900.

An interesting program with numerous good clinics will be carried out, and every effort made both to entertain and benefit those present.

The profession is cordially invited.

Secure receipts for transportation in order to get reduced rates.

A. D. Cage, *Secretary.*

LEBANON VALLEY DENTAL SOCIETY.

The annual meeting of the Lebanon Valley Dental Society will be held at the Allen House, Pottsville, Pa., May 15 and 16, 1900. Members of the profession generally are invited to attend.

P. K. Filbert, *Chairman Exec. Com.*

VERMONT BOARD OF DENTAL EXAMINERS.

A meeting of the Vermont Board of Dental Examiners will be held at the Bardwell House, Rutland, Wednesday, May 23, 1900, at 7.30 p.m., for the examination of candidates to practice dentistry.

The examinations will be in writing, and include Anatomy, Physiology, Histology, Bacteriology, Chemistry, Metallurgy, Pathology, Therapeutics, Surgery, Materia Medica, Anesthesia, Operative and Prosthetic Dentistry, together with an operation in the mouth.

Candidates must come prepared with instruments, rubber dam, and gold.

Applications, together with the fee, ten dollars, must be filed with the secretary on or before May 10.

GEO. F. CHENEY, *Secretary,*
St. Johnsbury.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

THE next regular meeting of the Illinois State Board of Dental Examiners will be held in Chicago, May 3, 4, 5, 1900, at the Chicago Business College, 67 Wabash avenue. Applicants must come prepared with instruments and material to do some practical work. Those desiring to take the examination should notify the secretary ten days before the date of meeting.

J. H. SMYSER, *Secretary,*
70 State street, Chicago, Ill.

OHIO BOARD OF DENTAL EXAMINERS.

THE next meeting of the Ohio Board will be held at the Chittenden Hotel, Columbus, Ohio, beginning Tuesday, May 29, 1900.

Examination will be both theoretical and practical. Applicants are requested to bring instruments, rubber dam, filling-materials, etc., necessary for making fillings or doing such other work as may be required. Engines will be supplied by the board.

For further particulars or application for examination, write to

DR. L. P. BETHEL, *Secretary,*
Kent, Ohio.

DENTAL EXAMINATIONS IN CONNECTICUT.

AT the last meeting of the Dental Commissioners of Connecticut it was voted that after January 1, 1900, every applicant for license, whether graduate or non-graduate, be required to pass a thorough examination, both theoretical and practical, the details of which shall be arranged later, and that all rules conflicting therewith be and are hereby repealed.

The recorder was requested to devise some plan whereby operations can be performed by applicants upon patients before the commissioners.

Full particulars as to the required examination will be given each candidate as soon as possible before the next examination, which will be held Monday, May 21, 1900, at the capitol in Hartford. It must be distinctly understood by all applicants who receive a temporary permit after January 1, 1900, that the examination passed to obtain the same does not exempt them from passing the regular examination for license at the next meeting of the commission.

GEO. L. PARMELE,
Dental Commissioner and Recorder.

HARTFORD, CONN., January 1, 1900.

TEXAS DENTAL ASSOCIATION.

THE next annual meeting of the Texas Dental Association will be held in Dallas, May 15, 16, and 17, 1900. Reduced railroad rates have been secured within the state, and a large attendance is expected. The profession cordially invited.

J. W. DAVID, *President.*
J. G. FIFE, *Secretary,*
Dallas, Tex.

EDITORIAL.

INTERNATIONAL DENTAL CONGRESS, PARIS, 1900.

WE publish elsewhere in this number two important circulars issued by the Committee of Organization of the International Dental Congress to be held at Paris in August next, and we take this occasion to call attention to them because of their especial importance.

The exhibit of work accomplished by the Committee of Organization gives a fair idea of the plan and scope of this great meeting. Probably never before in our professional history has such an extensive and elaborate undertaking been planned; a meeting which, if it is executed in accordance with its plan, will constitute the greatest event of its kind in our professional annals. The spirit which characterizes the organization, and in fact the whole movement, is broad and catholic. Conflicting interests have been united, and the whole profession of France has concentrated its energies upon the effort to make the Congress a success. They have gone further than that; they have appealed to the profession of sister nations in the same liberal and fraternal spirit, asking their co-operation in a movement which has shown no symptom of self-glorification, but is undertaken solely to the end that the development of dentistry in all its departments, the best that has been achieved, may be made manifest for the good of all.

The invitation to aid in this movement should appeal with peculiar force to the dental profession in America, and should elicit a cordial response for many reasons. We owe it to the profession of all countries to sustain the claims we so flippantly make at times for the advances in dental art and science which we have called our own. We need the effect of contact with the best that others have done to neutralize that provincialism of a certain element of our profession, who believe that there is no dentistry but American dentistry. We need to acquaint ourselves with the educational and legislative methods of other countries, in order to materially aid the movement which we hope will so unify dental professional standards that the accredited practitioners of one nation will ultimately find an open door to dental practice in all others of equal professional status. We need to explain our professional ideals and the methods we are pursuing for their attainment in education, legislation, dental science and art. The opportunity is a great one, and should not be lost. The dental profession of Europe will support the Congress by bringing to it the best it has to offer; the dental profession of the United States cannot afford to do less if we are to retain the prestige we have attained and the advanced position we have claimed.

International relations in dentistry have been pressing to the front for satisfactory adjustment. We are asking the nations of the Old World to recognize our dental degree as the badge of a professional culture and training equivalent to their own. Whatever the facts may be, or regardless of the justice of our claims, the adjustment of the differences of opinion which have hitherto prevented adequate recognition of the educational value of our degree in foreign countries can never be brought about until a mutual basis of understanding has been achieved through a careful presentation of the subject in all its details, and an intelligent study of them by the parties in interest.

Volumes might be written setting forth our standards of professional education, or the development of our art, and yet fail to bring us any nearer to a basis of unification on these important questions; while, on the other hand, the opportunity for conference and mutual study of our basal problems might easily lead to their satisfactory settlement. It is this opportunity which the International Congress at Paris will in large measure afford.

There is another reason why this Congress should appeal with peculiar force to the dental profession of America. Modern dentistry had its birth in France, and the impress made by those pioneers who first sowed the seeds of dental progress on American soil brought it from the parent plant, which at that time had its highest development in France. Dentistry as an art was practically unknown before the time of Fauchard, and it was his art that found such fertile soil in this country, whither it was brought by Lemaire, Plantou, and Gardette. It is to Fauchard, Duchateau, Du Bois Chemant, Foucou, and Fonzi that the world is indebted for artificial teeth of porcelain, which were developed and improved from as early as 1728 by these French dental pioneers. It is fitting therefore that we should participate in this Congress called by our French colleagues, if for no other reason than that we may bear to them the fruitful evidences of our ancient obligation. It is evident that the Congress is to be specifically a dental gathering, and its doors and privileges are open to all reputable dentists who are duly accredited by their several national committees. Ample means for transportation at reasonable rates have been provided, and the cost of attendance can be readily kept within limits attainable to the majority of practitioners. The inducements of the Exposition and the opportunities to visit other places of interest in and accessible to Paris, in addition to the considerations already alluded to, should influence all progressive members of our profession to take part in this meeting.

The International Dental Congress is not to be confused with the Stomatological Section of the International Medical Congress to be held in Paris shortly before the Dental Congress. As will be seen from the circular, the Stomatological Section of the Medical Congress is open only to dentists holding the medical degree, while the Dental Congress is open to all accredited ethical practitioners of dentistry.

DIPLOMACY AND DENTISTRY.

We learn through an Associated Press report, which has been extensively printed in the daily press of this country, that certain individuals with more energy than judgment have, through political influence, secured an audience with the Secretary of State and obtained his promise to instruct our ambassador at the Court of St. James to endeavor to have removed the restrictions imposed by the Dentists Act of England, which operate against the admission of holders of the American degree to practice in Great Britain.

Whatever may have been the inspiring motive of the act, it can only be regarded by any one at all familiar with the equities of the case as an impertinence which will be justly resented by the dental profession of England, and deplored by all American dentists who have a proper respect for the basal principles of dental legislation. We cannot for a moment believe that our ambassador will permit himself to be placed in a position that is illogical in view of the principles at stake, and ridiculous upon its face. We would certainly resent any diplomatic interference with our educational standards by the representative of another nation, and yet these superserviceable parties, without a visible constituency to support their action, have taken it upon themselves to do a thing which would be discreditable to American dental interests were it not apparently, and as we hope it is wholly, an individual expression of mental vagary.

MANILA DENTAL SOCIETY.

WE extract the following from *Freedom,* a daily paper published at Manila, Island of Luzon, showing that, notwithstanding the disturbed state of affairs consequent upon the military operations now being carried on in that island, the representatives of our profession there are alive to the importance of organization for mutual improvement. We congratulate them, and trust that their progressive efforts may produce abundant success:

"The Manila Dental Society was organized at a meeting of the representative dentists of Manila at the office of Dr. Hawley, Sunday afternoon, February 4, 1900. Dr. Merchant was elected temporary president and Dr. Hawley secretary and treasurer. The next meeting will be held at the Hotel de Oriente, Monday, February 12, at 6.30 P.M., for the purpose of effecting a permanent organization.

"The object of the society is the mutual improvement of its members and the advancement of the science of dentistry. A fraternal spirit between the members will be promoted, and every effort will be put forth to sustain and uphold the dignity and high standing of the profession.

"The promoters are anxious that all the dentists in Manila should take an interest in the next meeting, so that the work will be thoroughly discussed for the best interests of the association. All the officers for the first term will be elected, and a number of papers dealing on subjects of interest to the profession will be read."

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OBITUARY.

DR. LENDON S. STRAW.

DIED, October 9, 1899, at Newburgh, N. Y., Dr. LENDON S. STRAW, from lung trouble and general debility, in his seventy-fifth year.

Dr. Straw, whose death removes one of the landmarks of the profession in New York, was born January 22, 1825, at Hopkinton, N. H. After having obtained some experience in the dental art as then understood by serving as assistant to his father, Samuel Straw, he set up in practice for himself at Lowell, Mass.; he afterward practiced in Bangor, Me. In 1857 he established himself in Newburgh, N. Y., with which city he has been identified for the more than forty years which have since elapsed.

In 1864 he married Miss Mary Phalen, at Poughkeepsie, who, with one daughter, survives him.

Dr. Straw was a charter member of the Dental Society of the State of New York, established in 1868, and has ever since been prominently identified with that organization. He was also an honored member of the Second District Dental Society, having been its second president. Combining a cheerful, genial disposition and sterling qualities with a robust vigor of constitution, he had great personal attractiveness, and was a man of many friends. The following resolutions of regret were passed by his *confrères* of the Second District Dental Society:

"WHEREAS, Our beloved member of the Second District Dental Society, Dr. Lendon S. Straw, has been removed from us by death, it becomes our painful duty to make a record of our appreciation of his worth and our loss; therefore be it

"*Resolved*, That it is the sense of this society that in the death of Dr. Straw we recognize the loss of one of our most distinguished members. Many times called upon to serve us as president, he was to our younger members always a ready and prudent counselor, while our older members kept for him ever the first place in their hearts as a tried friend. Moving to our state from Bangor, Me., he entered upon the practice of his profession in the city of Newburgh, in the year 1857. Almost from the very first he took an active part not only in matters relating to his profession, but in all things relating to the public welfare. A man of genial nature and kindly heart, the years only added to the long roll of his personal friends. His taking away we regard as a great loss to our profession in the state, but mourn with those dear ones he has left behind, as for a noble and a generous friend.

"*Resolved*, That a copy of these resolutions be spread upon the minutes of this society, and that a copy be sent to the family.

"WILL JOHNSTON,
"WILLIAM JARVIE,
"O. E. HOUGHTON, *Committee*."

HINTS, QUERIES, AND COMMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—In the DENTAL COSMOS of October, 1899, in an article written by Henry S. Nash, D.D.S., New York, N. Y., on page 982 appears the following: "Now, my friends, I have to ask your indulgence just a moment longer before speaking of our mistakes regarding these alveolar diseases, for the purpose of saying to you that they have been made the subjects of the most critical investigation of which my time and health have admitted for a period of about twenty years. This was for a considerable portion of the time in collaboration with one of the most distinguished physicians and surgeons his profession has ever contained. At the time alluded to he was, and had been, the *dean* of the Bellevue Hospital College of this city. . . .

"It will perhaps be conceded that with the resources afforded me by Bellevue Hospital and College by the practices of the *dean* referred to, Dr. Frank H. Hamilton."

The Bellevue Hospital Medical College of the City of New York was organized in 1861. Austin Flint, Jr., M.D., was secretary from October 21, 1861, until about two years ago, when it became a part of the New York University. There is no record of there being a *dean*. The following record of Dr. Hamilton's connection with the college has been taken from the Second Decennial Catalogue of the Trustees, Faculty Officers of the Bellevue Hospital Medical College, by Frederick A. Castle, M.D.

"1861, March 31. Frank Hastings Hamilton, M.D., Military Surgery, Fractures and Dislocations, 1861-1865.

"Military Surgery, Fractures and Dislocations, and the Principles of Surgery with Operations, 1868.

"Chair declared vacant, April 21, 1875."

Dr. Hamilton died in 1886.

Also, on page 289 in the DENTAL COSMOS of March, 1900, are two illustrations in an article entitled "Case of Elongation of the Under Jaw," etc., by Dr. S. P. Hullihen. The models of this case are in the museum of the Baltimore College of Dental Surgery. KASSON C. GIBSON.

NEW YORK CITY, March 19, 1900.

TREATMENT OF THE MAXILLARY SINUS.—In the dental journals of late there is reported considerable discussion as to the best method of treating diseases of the maxillary sinus. The questions which seem to have attracted most attention are: Shall we invariably open into the sinus through the socket of an extracted tooth, or shall we sometimes, in preference to sacrificing a tooth which could be restored to usefulness, open through the canine fossa? Those who advocate the former procedure contend that an opening through the floor of the sinus, and the consequent loss of a tooth if one has not already been lost, is absolutely necessary in order that proper drainage may be obtained "from the lowest point." A good argument, surely, for every one admits the necessity of drainage "from the lowest point!" But when we consider the frequent irregularities of the floor of this cavity, caused by the projection upward of the dome-like plates of bone which invest the roots of near-by teeth, we are reminded that there may be more than one lowest point,—so to speak,—and that nothing short of removal of the entire floor would insure positively perfect drainage.

We must remember, also, that the term lowest is merely a relative one, and that the floor of the maxillary sinus is the lowest part of that cavity only when the head is in the vertical position; and further that the anterior wall becomes the lowest part when the head is held horizontally with the face downward. All of which justifies us in saying that perfect drainage may best be obtained from the canine fossa when the head is tipped forward into the horizontal position. With the head in this position, that which was the anterior wall becomes the lowest part, and the other walls all slope toward it like the sides of a funnel to its stem. We should say therefore, before sacrificing a savable tooth, open at the canine fossa, put the head in the horizontal position, and irrigate with a fountain syringe. This method has the additional advantage of permitting the use of a large quantity of irrigation solution without filling the patient's throat.

Should the alveolar process be honeycombed,—as it sometimes is,—or extensively channeled by an apical abscess with the sinus maxillaris secondarily involved, it might and probably would be necessary to extract the diseased tooth. These cases are, however, exceedingly rare. In the vast majority the apical abscess breaks directly into the antrum, without long and twisting channels.—HENRI LETORD, D.D.S., Kansas City.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING FEBRUARY, 1900.

Feb. 6.—No. 642,959, to Alexis E. Caron. Head-rest.
" " No. 643,038, to James W. Bryan. Dental articulator.
" " No. 643,039, to Calvert & Anderson. Dental plugger.
" *13.*—No. 643,443, to David Aiken. Amalgam expresser.
" *20.*—No. 643,868, to Willis H. Dwight. Denture.
" " No. 643,898, to Harry M. Hill. Dental oven.
" *27.*—No. 644,355, to George B. Haycock. Fountain cuspidor.

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ORIGINAL COMMUNICATIONS.

A REVIEW OF RECENT LITERATURE ON THE LOOSE TOOTH OR PYORRHEA PROBLEM.

BY A. W. HARLAN, M.D., D.D.S., CHICAGO, ILL.

(Read before the New York Odontological Society, January 16, 1900.)

IN reviewing the recent work of authors on the above problem I shall not depend on the published accounts of other critics, but will adhere to the text as I find it. Much of my time for several months has been devoted to the work of Dr. Henry S. Nash, of New York. Dr. Nash's work is entitled "Chronic Alveolitis," Pyorrhea Alveolaris being the sub-title.

This is a work of three hundred and sixteen pages, and it is said that a second volume is to follow. The author states that it is devoted to *causes, clinical history,* and *treatment,* with general directions for the care of the teeth. The work is divided into sections and chapters, just as it suited the fancy of the writer. In this manner we are led to understand the etiology and pathology of the author as *he* understands it.

After reading fifty pages we come to his first conclusions: "The twelve causes of alveolitis are as follows: A variety of hypercementosis which begins its development at the alveolar edges, lithemia, specific disease, atrophy, and scurvy. These form its symptomatic divisions. Following these are three kinds of metallic poisoning, lead, mercury, and bismuth. Of these, the latter is seen only as concomitant with marked dyscrasia, and very rarely even then. Then there are two varieties which have been named 'calcic,' as both are induced by tartar; one may be called 'deep-seated,' the other superficial. Next, one which is eruptive where the alveolus is only slightly affected.

"The twelfth is the most dangerous and mysterious of all. It is the one, I think, that has made its first appearance only in recent times. From the peculiar nature of its objective symptoms, it seems to me that there could be no more appropriate name given it than 'idiopathic alveolitis.' Certain analogies between nearly all of these forms of alveolitis are, however, shared by several of them. It would simplify their description if that which can be said of a number of them were considered in one section of a chapter, and alluded to prior to noting idiosyncrasies of each one.

"The most remarkable thing about them is the almost total absence of pain during any part of their origin and progress till the apical foramen is approached by the lesions, except, of course, among neurotic, rheumatic, and gouty persons at times, when meteorological or systemic conditions are favorable to its production anywhere in the body where there is anything abnormal going on among the sensitive tissues. At such times, if there is any pericemental disorder in process of development, there may be pain connected with it. It may also be located there by reflex action in the absence of the states just noted, but such cases are rare. . . .

"There is much confusion in the profession about its extension from one socket to another; a confusion which is amply explained by the fact that some of its types are of such a character as apparently to furnish a foundation for such supposition. All the varieties due to metallic oxids may include in their onset all of the pericemental tissues. The same may be said when the disease is incited by scurvy, but as a rule the side most commonly used in mastication is the only one to suffer. . . . In short, alveolitis is not infectious in the ordinary sense of the word, nor contagious, nor in any manner communicable from the sockets of one tooth to those of an adjoining one, except in a purely extrinsic way. . . .

"Idiopathic alveolitis makes its visitations with, as a rule, no warning; still, it may be sometimes preceded by slight pain. This is scarcely ever noticed by its victims. . . . The immediate exciting cause of the condition, which is sometimes painful, however, is something that is always present. . . . It may easily be demonstrated to be pathological, and even pathogenetic, but I think no one has ever mentioned this prodrome as being even objectionable in any sense, to say nothing of associating it with this disease. . . .

"The disease is not indicative so much of actual nervous exhaustion in a general way, although some degree of this is essential, as it is of a sustained diversion of energy from, or its irregular distribution to, parts upon the normal functioning of which good health depends. *But it is a certain indication of the existence of this state of things.* It constitutes a warning that this disease is being carried to the danger line, and a solemn mandate that its progress must be stopped if some catastrophe is to be obviated with any certainty.

"There is commonly, I think I may say always, a history of gastric or enteric dyspepsia, or both, of the atonic variety. With this, I repeat for the sake of clearness, there is sure to be some other evidence of nervous insufficiency, although it may not amount to the condition which we call disease unless this term is employed in its strictest sense. Sometimes this evidence will take on the form of spinal or general anemia, with ataxic glandular functioning of some sort. . . . Heredity, in its pathological sense, is one of the essentials. No cases of this disease will ever be seen where some of the immediate ancestors of the patient had not been very high livers. . . .

"Idiopathic alveolitis is, in few words (page 211), simply the local manifestation of a constitutional dyscrasia."

The remaining one hundred and five pages fail to show any more definite statements from the author of this work. The book is fascinating from its lack of style and arrangement, and its peculiar logic. I have read it over at least three times, which, I assure you, is more times than I have read "David Harum" or "When Knighthood was in Flower." Still I do not find it satisfying. I would like to re-edit it and cut it down to one hundred pages, and then it would sell and be of use to the community. What is the author trying to tell, personal experiences in the search for the causes of loosening of the teeth, or the real causes? Also, why does he seek to give another name to this distressing malady? In doing this he gropes about in coining words like neur*os*thenia, acronic, and "a very minute hyperplasma may occur in the pericementum itself," whatever that may mean; uric acidemia is another of our author's coinings which express nothing. "Pericementosis" is also one of the anomalies of nomenclature as written by the author of this very great work. (I do not mean by these comments to impugn the value of Dr. Nash's observations, but to express my disapproval of his methods of expressing himself.) What are the essentials in writing a book if they are not to render clear the meaning of an author? In these three hundred and sixteen pages are interspersed many anecdotes of things not relevant to the main ideas or thoughts of the author, who labors so hard to convey his meaning to his professional brethren. The work as a whole is full of good things, many of which are lost by the lack of proper consideration in their proper place. We await the appearance of the second volume with much impatience. It is hinted in the pages already written that he has a system of treatment more or less infallible, and we must possess it sooner or later.

Barrett ("Oral Pathology and Practice"): "It has been intimated that the exact nature of the disorder has not yet been determined, at least no exposition of it has been generally accepted. That its seat is within the alveolar socket is easily demonstrated, and that either the tooth-root or its investing membrane is an essential factor in its existence is quite plain, for extraction always affords a radical cure. Beyond this, then, there is no admitted certainty concerning its etiology. . . . We must recognize at least three separate pathological degenerations that are covered by the term, and which, without doubt, are often confounded with each other. The first of these will be entirely local in its character. It will have its origin in an easily comprehensible cause, local irritation. The second will have its etiology in deposits of a hard, nodular character upon the roots of the teeth. It will be distinguished by the formation of distinct pockets within the alveolus. The third will give evidence of some distinct cachectic condition or dyscrasia. It will present phenomena that are peculiar to itself, and will be without either of the two previously named factors."

The work quoted from is a text-book in dental colleges, and it may fairly be said to constitute all that a student gets in a course of lectures on dental pathology and etiology concerning the loose tooth problem.

Eames ("The Practice of Dental Medicine") : "It is the writer's opinion that the disease known as pyorrhea alveolaris is in nearly every case the result of a constitutional diathesis; that the teeth are in these cases the victims of the local manifestations; that the diathesis, in whatever form it may be, manifests itself in other organs besides the teeth, and that to demonstrate the connection of a diathesis with the teeth it must be shown not that its symptoms always coexist with pyorrheal symptoms, but that the conditions of the pyorrhea vary in intensity with the condition of the diathesis, or, to put it in another way, that curing the diathesis cures the pyorrhea. If removing the teeth, followed by a cure of the local pyorrhea, proves the disease to be local, it is still necessary to point out the local cause, for the teeth themselves cannot be held to be a cause, since in that case every one so unfortunate as to lose teeth would pay the penalty with pyorrhea; moreover, constitutional symptoms may yet be found to be present.

"'If it is held that poison, at first local, has infected the whole system, still we ask for the origin of the local manifestation, and may even expect that when the teeth have been removed tartar will not collect on artificial plates and the constitutional symptoms will disappear, or at least improve in a remarkable degree, provided structural change and otherwise permanent injuries have not taken place."

Bödecker ("The Anatomy and Pathology of the Teeth") : "In regard to the etiology of the disease under consideration, few positive facts are known, but hypothetical speculations about it are abundant. Prior to the time of Riggs (1867) pyorrhea alveolaris was believed to be a disease of the gums. Riggs himself was of the opinion that the disease was a necrotic condition of the alveolar process. In 1873 Magitot proved that the trouble was situated in the pericementum. C. S. Tomes first made the statement that pyorrhea alveolaris was not due to deposits of salivary calculi, which up to this time was believed to be the cause. . . .

"It cannot be denied that a superabundance of uric acid in the system may assist in producing pyorrhea alveolaris, but it will not exert more influence in this direction than consumption, anemia, nephritis, hepatitis, diabetes, arthritis, syphilis, typhoid, chronic diseases of the nervous system, etc., which are often found associated with pyorrhea alveolaris.

"Furthermore, it is an established fact that sometimes uric acid is present in the system without producing gout or rheumatism.

We must therefore admit that the cause of the disease under consideration, principally, is a more or less chronic general ailment, and not due to any particular form. At the same time we meet with many cases of pyorrhea alveolaris which can be attributed to nothing but heredity. The disease is mostly limited to middle age, although exceptionally we see it in persons under twenty years."

Talbot ("Interstitial Gingivitis"): "Among the many questions which the present treatise is believed to settle (so far as experimentation can) is the following: The question of the influence and nature of its etiology. It is shown that here and elsewhere in biology the etiology of morbid conditions has many phases; that in it exciting and predisposing causes have alike to be considered; that while causes may be constitutional in origin, they may often exert their action locally; that the disease is not a product of civilization, nor a product of any one etiologic factor; that there is no ground yet adduced for believing the disease to be specifically infectious and due to a germ of a specific nature; that in it the germ infection occurs as a consequence of existing disease, and is not the cause of the morbid condition, but one of its stages, pyorrhea. The experiments made, as well as the pathologic and clinical data, have been obtained from many observers, so that as many control observations should be had as were necessary to eliminate personal elements of error inevitable upon original observation and research.

"In the pathology no statement is made which is not demonstrated by corroboratory data, including a photograph of the condition. The treatment has been based upon the pathology and etiology. Its central idea is that the human being must be regarded as something more than his mouth and teeth; hence the duty of the dental scientist is, like that of all medical scientists, best shown in a prophylactic direction. . . .

"The mass of evidence previously presented demonstrated that the causes of interstitial gingivitis are divisible into predisposing causes (which may be subdivided into local predisposing and constitutional) and exciting causes. The exciting causes are either constitutional or local, but as a rule are local, or have local action. The predisposing factors of this disease, as already mentioned, are conditions of jaw evolutions, transitory nature of certain structures, degeneracy, and previous conditions of irritation and inflammation. Moreover, in accordance with a general law of pathology whereby tissues (for example, the lungs in pneumonia once attacked by toxic agencies, or even by the toxins of germs) acquire a local predisposition to future attacks of disease, the gums and alveolar process often become then susceptible to constitutional and local influences.

"It is obvious from the data given in the chapter upon 'history' that interstitial gingivitis is as old as man, and that it was observed and discussed by the earliest writers on medicine. *While it is by no means improbable that constitutional factors assisted in its early progress in man, still the exciting cause of this disease was tartar.* Many skulls from prehistoric periods exhibit gingivitis upon the teeth exposed to the influence of tartar (*sic*). This gingivitis extends along the roots nearly or quite to the apices, resulting in the absorption of the alveolar process. Upon the surface of the teeth where tartar is observed, interstitial gingivitis and absorption rarely occur. The same is true of the teeth of wild animals at large and confined in zoological gardens. *In them gingivitis from local conditions, other than tartar, seldom occurs."* (Italics mine.)

Rhein, "Pyorrhea Alveolaris," a paper read before the Chicago Dental Society, published in the *Dental Review* for March, 1899: "The disease may be divided into two general classes: one where the exciting cause is practically the only cause of the disease, and which makes the condition purely a local trouble. This form may be called pyorrhea simplex, in contradistinction to the other class, pyorrhea complex, where there is a predisposing cause back of the local irritant. . . .

"*Pyorrhea Complex.*—Although in all forms of this disease our chief duty is to keep the mouths of our patients free from any exciting cause and to reduce all conditions of inflammation, still where there is a predisposing cause, which in itself is productive of the local inflammation and the irritation against which we are contending, this predisposing cause in such cases becomes *the* cause.

"Most forms of the disease are accompanied by deposits of concretions upon the roots of the teeth of varying consistency and different compositions. These deposits vary greatly, according to the form of the disease; and, again, there are some forms where no deposits are found."

No attempt has been made to quote from other authors like Sudduth, Black, Miller, Peirce, Kirk, Younger, Magitot, Fitzgerald, Witzel, or Wedl, as it is presumed the audience is already familiar with the views of these latter writers, as well as others whose names have not been mentioned. If the views of the six gentlemen from whom I have quoted so freely do not express the correct thought of the profession regarding pyorrhea alveolaris, then where are we to look for further enlightenment? It is stated by Nash that what we know as idiopathic alveolitis does not date back more than one hundred to one hundred and fifty years. Talbot, on the other hand, concludes that the ancients (from an examination of prehistoric skulls) suffered from interstitial gingivitis. Have we any facts to guide us in searching for the predisposing causes of loosening of the teeth from the work of the authors just quoted? Talbot says, as I have quoted him, that in wild animals *gingivitis from local conditions, other than tartar, seldom occurs.* Still, in his observations on dogs he says they suffer from interstitial gingivitis really analogous to the disease in man. His photographs and microscopic sections appear to prove this. If the loosening of teeth is due to malnutrition, it would seem that wild animals or those in zoological gardens would suffer from this cause more than from other causes, and still, in spite of this, he makes the above statement. Rhein says that the complex form of pyorrhea is *the* cause in all cases where we have no local or exciting cause. This includes all forms of disease of a constitutional nature, including heredity. The local causes are not clearly stated. Talbot in his condensed summary says degeneracy, the transitory nature of certain structures, and jaw evolution are among the predisposing causes. If in prehistoric times man suffered from the above factors and still had interstitial gingivitis, of what value to include them now? Were not the alveolar processes transitory structures in prehistoric times? Were not the jaws and teeth of man just the same then that they are now in shape and form, and even in the number of teeth? Were there no degenerates in those days? It seems to me that the conclusions are lame, and not capable of convincing proof.

Bödecker does not express any decided opinion other than that "heredity and a chronic general ailment" may be reckoned as the predisposing cause of tooth-loosening. Indeed, I think his summary of the causes, exciting and predisposing, quite clear, although they may be erroneous.

Eames in his summary holds, as you have heard, that constitutional disorders must be looked for to account for loosening of the teeth.

Barrett holds in his summary that the origin is in the socket or the investing membrane, and thus in a general way commits himself to the local origin of the disease under consideration. However, he recognizes the influence of a cachexia, showing the dissimilarity of local causes from those produced by the predisposing factor or dyscrasia.

Nash says idiopathic alveolitis is simply the local manifestation of a constitutional dyscrasia. He further states that heredity plays an all-important part, as "some of the immediate ancestors of the patient have been high livers." He rejects the idea of infectiousness or contagiousness of this disease. On the other hand, he says in his twelve varieties of alveolitis that two are caused by calcic deposits, deep-seated and superficial, three by lead, mercury, and bismuth, and one by hypercementosis. Then, again, scurvy is a cause. Further, atrophy and eruptive alveolitis constitute two more in this list of causes. Specific disease is also mentioned (syphilis, we presume) as one of the twelve causes.

If you will permit me to refer to his final condensed statement you will observe that it is not in consonance with the above (mostly) local causes of loosening of the teeth, for he says it is a "local manifestation of a constitutional dyscrasia." To sum up these contradictory views we must conclude, first, that teeth are loosened in their sockets by neglect of the owners and failure to use prophylactic measures; second, teeth are loosened by the action of medicines taken internally; third, teeth are loosened by injudicious extraction and by careless operations (wedging, ill-fitting partial dentures, bridges, crowns, etc.); fourth, teeth are prone to loosen by and through hereditary predisposing causes; fifth, teeth loosen in consequence of malnutrition or malassimilation and retention of waste products through non-elimination; sixth, teeth loosen by reason of improper food habits, faulty hygiene, lack of occlusion, irregularities, loss of contour, and non-use; seventh, teeth loosen through infection, direct and through the blood-current carrying infective material to a previously weakened situation; eighth, teeth are loosened by pernicious habits, tobacco, mouth-breathing, etc.; ninth, teeth are loosened as a consequence of the continued chronic maladies affecting the mucous membrane of the mouth, nose, throat, and alimentary tract (catarrh and constipation); tenth, teeth are loosened by the formation of salivary, serumal, and other deposits on the necks and roots of teeth, and the wasting of the alveolar process and disappearance of the gums through medicinal causes and improper local use of remedial agents; eleventh, teeth are loosened through the agency of irritants, local and general (overfeeding), by climatic environments, and as a result of chronic diseases (Bödecker), and rarely from nervous exhaustion; twelfth, teeth are loosened in their sockets from local causes at an early age, but later constitutional maladies are the predisposing factors; but no account is taken of that large class of cases where no hereditary, constitutional, medicinal, or other form of ailment or bad habit can be found to satisfy the theories of the authors above quoted. Still, the teeth do loosen, and from purely local causes or local infection.

ALVEOLAR NECROSIS.

BY HENRY S. NASH, D.D.S., NEW YORK, N. Y.

(Read before the New York Odontological Society, November 21, 1899.)

GENTLEMEN: In response to your very flattering invitation to read another paper before you, I have prepared the present one on necrosis of the alveolus. I was led to the selection of this subject by reading the report of the discussion upon it which took place at the April meeting of this society. This report was very interesting, and I was much impressed with the candor and sincerity of all those who took part in it.

To the best of my knowledge and belief, there has been no literature whatever presented to the profession upon this topic, and the nature of the discussion alluded to seems to be confirmatory of this opinion. The nature of the disease also is so peculiar, the systemic condition which admits of its occurrence so difficult of detection by dental surgeons, its different stages or phases so entirely unlike each other, the great proportion of spontaneous recoveries from some of these stages, and the numerous obstacles in the way of tracing any connection whatever between them, all serve to render any positive conclusions about it so nearly a mere matter of chance that, without making it a subject of regular and very long-continued observation, such conclusions may be said to be absolutely impossible to arrive at. Even observation of this character is almost impossible from its scarcity in our practices, our experiences with it being too infrequent to admit of studying it in all of its different aspects. This fact became abundantly apparent during the discussion mentioned. Still another almost insuperable obstacle in the way of investigation consists in the great length of time which each stage lasts, sometimes from five to ten years elapsing before one merges into its successor. In the mean time the patient has passed from observation, and perhaps a spontaneous recovery has effaced all track, trace, or resemblance of anything pathological in the gingivæ.

If all these circumstances are given due weight, it may well be considered unlikely that its history should ever be written up by any one.

Now, this being the case, and I am certain that you will all coincide with me that it is, it will be in order, I think, for me to explain the reason why I have prepared this paper and am indulging the hope that it may not prove uninteresting to you, although this will involve a momentary digression. In fact, I feel called upon to do this, for I am most unwilling to be classified among those who attempt to speak learnedly and profoundly upon subjects of which their hypotheses demonstrate them to be almost totally ignorant.

So I ask your indulgence while making this explanation: For many years I was placed under very extraordinary circumstances respecting periodontal pathology, circumstances by virtue of which as many cases of alveolar diseases came to my notice as could ordinarily be seen in a score of practices. I will not weary you by detailing the conditions that afforded me such opportunities. They are mentioned in the revised edition of my work on "Chronic Alveolitis," which is just published. There is, however, no special mention of alveolar necrosis in this book, it being alluded to merely casually as one of the diseases by means of which teeth are loosened and lost. There are two reasons for this, the principal one being that I felt dissatisfied with some of the conclusions arrived at in respect to certain portions of its history until after the volume was out, and it was decided to place its description at the end of the second one, rather than introduce it in the first, which had already topics enough. This course will admit of a still more careful investigation being made of an important part of its history than I have been able to accomplish as yet. It is a part about which I am still undecided in respect to some of its features.

The other reason is not so satisfactory. It is that necrosis of the alveolus cannot be termed "alveolitis," "Chronic Alveolitis" being the title of my work. The affected bone does not disappear by a process similar to caries, but by absorption at first; then it dies and is exfoliated. There is no inflammation nor pus-formation during any phase of the uncomplicated disorder; still, inasmuch as eruptive pericementosis and the atrophic types, which are in the same category so far as inflammation and pus are concerned, are given clinically full descriptions, it might have been treated in the same way had I been as well satisfied with the state of my information about it as I was with it respecting them.

I will take a moment more, if you please, to state the origin of the term "chronic alveolitis." After becoming satisfied that there could not possibly be any one, single, specific disorder to which this loosening is confined, but that it is caused by twelve or thirteen quite distinct ones, and that the term "pyorrhea alveolaris" was so inappropriate as to be likely to fall into disuse by our more intelligent members, a series of as accurate descriptions as I could make was written out and given to Dr. Frank H. Hamilton, whose private pupil in medicine I had long been, with the request that he would decide upon a generic designation for the whole group, for we had been calling it by quite a number of different ones as we became better acquainted with it. This occurred a long time after my regular association with him, although I was still seeing and consulting with him frequently.

There was no one in the city more competent to find a name for this group than was he. He had been for many years the dean of Bellevue Hospital Medical College; had shown great interest in my investigations concerning these periodontal diseases, and was guiding them as only such a man can do. He thus became abundantly capable of granting my request.

The written descriptions were given careful scrutiny, and the decision was finally reached that our medical lexicology contained no more appropriate term for this group than the one just mentioned. His decision was based on the fact, which no intelligent person can deny, that "alveolitis" is by far the most common condition among them. This must be apparent, as stated, to any one who has given his attention intelligently to them, no matter what name he may have applied to them. I wish to repeat that the designation "chronic alveolitis" is a generic one. Should any of my professional brethren therefore hear me speaking of a patient as having *the* chronic alveolitis, or designating any particular type as being simply and solely such, as we hear the term "pyorrhea alveolaris" used, he would be amply justified in coming to the conclusion that I knew very little about that of which I was speaking, and that my writings and speeches concerning it would necessarily be unworthy of any attention.

I feel like apologizing for having taken up your attention so long with matters only indirectly related to our subject, but as a profession we are unrivaled in respect to making mistakes and obstinately clinging to and reiterating theories which have their birth in those misconceptions of basic, elementary principles of pathology, pathogenesis, and general physiological functioning from which we can scarcely expect a dental surgeon to be entirely free, unless he has paid especial attention to them.

This disease,—alveolar necrosis,—taken as a whole,—*i.e.,* from its first manifestations till the gums no longer cover the necrosed alveolus,—is one of the rarest ones which ever comes to our notice. Notwithstanding all the advantages I have had, I have not been able to make complete records of more than a few cases, although I have seen its initial stages times without number. Its clinical history, in brief, is this: There is a deposit on the teeth of that which, till about forty years ago, had been called soft tartar, but which we now term "sordes." In those places which are not reached by either the brush or threads,—*i.e.,* the interdental spaces, or, more particularly, the corners of these spaces,—the gums become of a bright scarlet color on their margins. This color may be near one single tooth, or every one in the mouth may have it around its neck. This is determined by the state of the receptivity of the gums and the thoroughness with which the accumulations are removed. This constitutes its first stage; one from which recovery is the general rule,—so general, in fact, that I have never known of its being considered by any one as a condition antecedent to alveolar necrosis, and still it is uniformly prodromous to it in all except its traumatic or purely organic types.

The second stage is characterized by no variation in the color of the gums, but only by the absorption of all the periodontal tissues till the apical region is very nearly reached. As a rule the spontaneous recoveries from this stage occur in probably ninety-nine per cent. of all the cases. There are two instances of it in my own mouth. Lost tissue is seldom, if ever, regained, as it always is where recovery occurs in the first stage.

The third and last stage is where the gums no longer cover the edges of the alveolus, which now assume the dark color from which the disease takes its name. Even from this stage recoveries are frequent without treatment, and generally possible with it.

The records which were taken of the completed disease are all so similar that I am sure of my grounds as to all its clinical aspects. Therapeutical results were also quite satisfactory, or easily accounted for, in all those cases where I could be certain that all the directions given to patients were observed by them. These directions were, principally, that the teeth must be kept as absolutely free from accumulations as was possible, but I soon learned that the ideas of patients as to what constitutes "absolute freedom" were very diverse indeed.

Etiology.—Perhaps I ought to confine myself to speaking only of the clinical aspects and treatment of our subject, but this course would leave a topic of much importance unconsidered,—viz, the reason why certain localities become points of determination for its development. Besides, if this part of its history is understood previous to speaking critically of the changes and progress of its three stages, these will not appear to be so mysterious as they would be otherwise.

Efforts are now being made by some of our noted neurologists, like Professor Frænkel and some of his friends, to have diseases classified as either functional,—*i.e.*, as arising from ataxic, or disordered functioning of the sympathetic nervous system,—or organic,—*i.e.*, as arising from toxicity, either systemic or microbic, or from toxins introduced into the system from external sources, or from traumatism. The latter has long been taken to be all there is relating to pathogeny, but recently the former has taken equal rank with the latter, or even greater; and this classification is being recognized and accepted by the most eminent men in the medical profession.

If we concede, however, that the predisposing causes of a disease should properly form a part of its history, I cannot imagine that there can possibly be a rigid line drawn between these classifications in every instance, for there must be a large number of disorders which would belong to the functional division in the first part of their course, and to the organic one in all the remaining ones.

It would certainly puzzle any pathologist to show why alveolar necrosis should be purely organic, except in its clinical section, for the lessened resistance of the soft tissue, which alone admits of its yielding to attack, is as purely and certainly functional as anything well can be.

Of course, I am speaking of it *as we usually* find it, and not as we see it when it is caused by arsenious acid, phosphorus, or accidental injury. These, together with the other metallic types and the syphilitic and cancerous ones, really do form a strictly organic division, but it is one, however, with which dental surgeons cannot properly have anything to do. With the exception of these types, it is plain that necrosis of the alveolus cannot possibly be entirely functional nor entirely organic.

Since noticing this disposition to classify diseases as mentioned, there was nothing to do but push the investigation of our subject along the functional line in respect to the establishment of those conditions under which alone it can take place. The reason for adopting this course will be plain, for the organic types furnish their own histories and indicate their own therapeutics.

Injury to the sympathetic or vegetative nervous system comes mainly from three sources: First, and principally as a predisposing factor, is heredity; next in importance and frequency is its subjection to a long-continued strain from the use of stimulants, and, lastly, from some depressing influence of a sustained character, like domestic afflictions, pecuniary losses, severe application to study, etc. Although it may appear to be antithetical, there is good reason to think that a strong and sustained elation of spirits is also productive of disturbance of sympathetic functioning.

This branch of our nervous system is extremely peculiar in respect to the manner in which its impairment is exhibited. A sudden and hard shock is followed by immediate symptoms of disturbance, then permanent recovery unless some of the pathogenetic influences just mentioned are present, when such shock might even prove fatal. On the contrary, a prolonged, agonizing experience will be apparently quite unproductive of such disturbance till months, and sometimes many months, have elapsed. Then a neurosis of some kind will develop itself, provided always that heredity or habits, etc., may be present to admit of it; but its real cause is extremely seldom assigned the responsibility for it, for the patient takes it as a matter of course that the precedent conditions of nerve-strain or depression have been entirely recovered from. In other words, we forget the extraordinary functioning or taxation which this part of the nervous system endured so long ago, as it is natural we should, in view of the good health enjoyed by us in the mean time. We were not aware that an unusual tax upon it in one of its branches must be at the expense of its activity in some other, and is sure to be accompanied by relaxation in the latter, the duties of which are accumulative, and must be resumed on a correspondingly increased degree later on. Now, let us imagine that there is an incomplete restoration of the powers of the overtaxed branch, due to heredity or the presence of some of the other pathogenetic influences mentioned; and suppose also that an actual deficiency of normal vigor seems to be made up through the agency of artificial stimulation, and we can easily imagine also that the final restoration of the pre-existing equilibrium may involve serious results. I presume that many of us have noticed that serious calamities to some of our patients have been followed by broken health, or, as pathologists express it, by lessened resistance to pathogenetic agencies, and the consequent advent of such agencies. This we have attributed to "brooding over their misfortunes," letting them prey on their minds, etc., until finally their health gave way and they became more or less chronic invalids.

The records which I made of that portion of the career of alveolar necrosis which is prodromous to its clinical one are so nearly identical that descriptions of its manifestations with a few of my patients will serve for the others,—*i.e.*, the predisposing causes were the same in general principles in all of them.

When I first came to this city I was associated with Dr. Joseph H. Foster, who placed three sisters in my care. This occurred not long after Dr. Dunning had sent a young girl to me whose right upper central incisor was loosening, with the request that I would undertake the general investigation of the disease that was accomplishing this result, which I did.

These sisters were aged from twenty to thirty years; were maidens at that time, and all gave manifest evidence of neatness in all other noticeable respects than with their teeth. The margins of their gums were, in the case of the eldest, of a light scarlet; in that of the younger one they were hyperplasmic, while with the youngest there was recession to some extent.

Accumulations must have been in contact with all the gingival edges, for the mischief mentioned could not have been caused by any other agency. I called the attention of each one to this fact, stating that her gums were being injured by tartar, for although the term "sordes" was in use at that time by the members of the medical profession, its significance—Grecian for filth—did not seem to dental surgeons acceptable for tartar.

Each lady assured me that she used her brush thoroughly every morning before breakfast and upon retiring at night. They were quite sensitive about my having spoken to them as I did, each one asserting that she knew she gave them too much attention, for they were sore at times. I did not dispute them, thinking it best to let them do as they liked. One of them said she was satisfied that Dr. Foster thought she only brushed her teeth just before coming to him, because he said so much to her about it. I confess I had reached the same conclusion, for I could not imagine how "tartar" could form so rapidly as it must have done had they not been mistaken.

I had had these patients for some time subsequently to having placed myself under Dr. Hamilton as his pupil when it occurred to me to describe the state of their mouths to him, and ask him how rapidly tartar could collect to be injurious. His reply was that after a long illness it might require removal two or even three times a day, but that he presumed the trouble with my patients was not from tartar, but from sordes, which sometimes accumulated very rapidly, but only in the case of persons who were or had been much "run down," and especially when the patient had had a long, tedious illness following a period of great mental depression.

I have no doubt that many of you will be able to confirm the opinion that the soft, creamy, pearl-gray substance which we are now taught to call "sordes" is not uncommonly found under the conditions described above, and then only. Still, it is not often that one hears of its being differentiated from freshly-deposited tartar, the principal clinical difference being that the latter concretes while the former does not. It is sometimes, however, mingled with tartar, when partial concretion occurs.

Upon returning from my interview with Dr. Hamilton, occasion was taken to speak to Dr. Foster about the untidy habits of these sisters respecting their teeth. They were ladies of refinement, and, as stated, I could not understand why neither of us could induce them to care properly for their teeth. When he was informed of Dr. Hamilton's decision respecting sordes, and the circumstances under which it appeared, he remarked that none of them had been ill, but that the family had been very wealthy until the failure of the Ocean Bank, which occurred, I believe, in 1856, or about eight years previous to my seeing them. He added that this event had cost the family the loss of nearly all their fortune, and that they appeared to lose interest in everything since that epoch. That previously they had all taken excellent care of their teeth, but that since then they had lost heart for everything, and now they used their brushes only when they were about coming to him. He felt certain of this because their gums were so often inflamed at their margins. Attention will soon be called again to this word "inflamed."

Not long after this conversation took place another case came to me, recommended by the ladies in question. It was that of a young woman recently widowed. She was not cachectic, but sordes was on her teeth in abundance, but only a few of the gingival borders were scarlet.

The First Stage.—When the conversations alluded to above occurred, none of us supposed for an instant that we had been discussing a stage of a disease that might terminate in alveolar necrosis, but it did occur to me that I had a most attractive mystery to pitch into; so the occasion was utilized to the full extent of my capabilities. I determined to make accurate records of the state of the gingival tissues in every case where sordes appeared, to learn just what the effect of keeping the teeth quite free from its presence would result in; what care the teeth received in each instance, as well as to ascertain what was the physiological condition, etc., of each patient's immediate ancestors, as Dr. Hamilton had advised me to do in the case of the patient whom Dr. Dunning sent me with a loosening incisor. This was to enable me to judge respecting heredity. These records were faithfully kept for more than twenty years.

The eldest of these sisters was in much the best physical condition, as is usually the case in neurotic families. In fact, it was impossible to detect the least trace of heredity about her, by any means which a dental surgeon would be allowed to employ, for a great portion of the time. Often and for long periods her state would not only counterfeit absolute eucrasia, but would greatly surpass this plane of normal vigor. But the latter is a pathological state; one termed "neurosthenia" by the French and Italian neurologists, —a term we will have to adopt ourselves some day,—and is due to sustained stimulation of the vegetative nervous system. Such things as these render it impossible at times to judge respecting heredity, so that I feel justifiable, when it becomes important to have this matter settled, to question patients about the customs, etc., of their parents. I found in this way that the father of these ladies was extremely cachectic, and his habits were such as to keep him so till his death. When this occurred there had been no accumulations except tartar on her teeth for about eight years, but within eight months thereafter it was accumulating in abundance, and was causing the scarlet line to appear on nearly all the gingival edges.

She has now had five experiences of this kind. The first has been referred to; the second was the one just alluded to; the third was furnished by her mother's death; the fourth from the long illness and death of her husband, for she married about fifteen years ago, and the fifth from the serious illness of her son, a very fine lad, aged about ten years. This occurred last spring. Her gums are now presenting the scarlet border, and can be seen by any of you who desire to do so, unless a spontaneous recovery has occurred during the last few months. If this has not been the case I will let any of my brother practitioners see these gums who has not seen similar ones before. A recovery by this time is improbable, as attacks occur at shorter intervals after each of her distressing experiences, and last longer upon each occasion.

In one place in her mouth, however, the second stage has developed. This is between two upper bicuspids, of which the approximal contours were destroyed by Dr. Foster's separating file when she was a small child. I have no trouble in controlling it temporarily, but after each of the experiences mentioned a noticeable advance has been made toward the apical region. In this location lessened resistance is undoubtedly due to the readiness with which the impaction of food occurs, and the difficulty or neglect of removing it.

The experiences of the sister next to her in age have been almost identical; so much so as not to be worthy of special notice.

The youngest had the disease in its first stage when she came under my care, but it did not seem to be amenable to treatment. It puzzled me very much why it should persist, while she assured me that she used the brush as frequently as her sisters did, together with a powder furnished by Dr. Foster. This powder was an extremely harsh one. It was made by a panpharmacal firm, and was the worst one I have ever examined. I had warned her against using it, telling her it would injure both gums and teeth. In fact, she was placed in my hands at first to have the necks of her upper cuspids filled where her brush had removed the cementum. But my advice has never gone very far with her, nor has that of any one else. At first I did not wonder, for I was a mere boy, many years younger than Dr. Foster, whose advice had been, I knew, the reverse of mine. She was decidedly of the opinion that the brush made her gums sore, but could not be prevailed upon to believe that the notches and sensitive places in the necks of the incisors and cuspidati were due to anything else than the inflammation of the gum-margins or the secretion of acid mucus, an idea which has had quite a vogue. This was Dr. Foster's idea, he having succeeded in imbuing her with it in some way or another, doubtless being aided by her own strong repugnance to using a brush at all; a fact I learned quite incidentally, but in a way to make me decide to refrain from ever giving her any advice in future till some unfortunate experience should teach her the necessity of accepting it and compelling her to ask for it. This did not occur, however, till the necks of all the upper teeth except the molars had been filled with gold, a fate which her sisters had been sensible enough to avoid.

One day the mystery about thoroughly brushing her teeth and still having the scarlet border on her gums was solved. These patients had early morning appointments, on account of family reasons, when their teeth really were clean. The difference between sordes and tartar had never been explained to them, Dr. Foster including both under the name "tartar," while they supposed, and properly, that tartar was deposited in a state of partial concretion. They were justified, consequently, both from their standpoint and as a matter of fact, in declaring that they did keep tartar from collecting on their teeth.

This became apparent when this youngest sister changed her appointments from 9 A.M. to 4 P.M. Upon first seeing her at this late hour I found sordes in plenty, and explained to her that this was the cause of that which Dr. Foster had termed "inflammation." She was now in a state of mind to bear questioning, something unusual for her. Upon taking advantage of it, it transpired that they had attributed the scarlet borders mentioned to too much brushing, very naturally. They had thought Dr. Foster unreasonable in insisting so strenuously upon harder and more frequent use of their brushes, and had, consequently, not allowed them to touch the gums but once a day,—in the morning. After that the teeth were brushed on the occlusal surfaces only, thus avoiding "making the gums sore," but allowing sordes to remain in contact with them for the greater portion of the twenty-four hours of each day. This sister is averse to cleaning her teeth anyway; is always "glad to have it over," and has a singular repugnance to inspecting her own mouth. I have never been able to induce her to look at a filling upon completing one, although she is nervously anxious about their being visible when she smiles.

I tried to ascertain how long it required in her case for sordes to collect in sufficient quantity to be noticeable, but was unable to induce her to second my efforts. By way of explaining her eccentricity, it should be said that she is too much of an invalid to be held to a strict account for it. About this time she went abroad, where she remained for about two years. Long before going she had been using a two per cent. solution of carbolic acid on her toothbrush, as had her sisters, for I had found its effects to be an almost immediate cure for any mischief from sordes. But she did not take any with her on her trip. This I learned from one of her sisters a few weeks after her departure from this country. I was given her address and urgently begged to write to her, explaining the great importance of continuing to employ the acid. For a long time I received no reply, but one came at last, assuring me that her gums were entirely well; that she saw a great deal of company; that the acid was offensive to her; that it had always given her a bad breath, etc., and, finally, that she thought she would wait till her return, and then consult me again about it.

On her return she did come to see me, and I found an alarming change in the condition of her mouth. There were no scarlet edges to the gums indeed, but the disease had entered on the second stage and had progressed more rapidly than I have ever known of its doing in any other instance. Every tooth in her mouth was affected. Had she remained from five to eight years longer she would have joined the happy band of edentata. She had been told by some dentist that the disappearance of the scarlet border indicated a cessation of the attack; at least this was the account she gave me, and his dictum seemed to be confirmed by the experience of her elder sisters and that of the friend they had sent to me.

She was taken in hand at once, and all the affected tissues, except those surrounding a useless third molar, were frequently and thoroughly treated antiseptically. This molar was left for observation. The attack ceased very soon where treatment had been given, the molar falling out about ten years thereafter.

Since the earlier part of this paper was prepared, still another case of the first phase of this disorder has been in my hands. It was seen also by one of my neighbors and friends, who is, or intended to be, present this evening, Dr. Sweetser, who will, I am sure, take pleasure in describing it to any one who wishes to have him do so. It is that of a young lady who has been a patient of mine for about sixteen years. Coffee cachexia is present to a marked degree, but she has not had a scarlet line about any of her teeth, so far as I can learn, till the present time.

Twelve years ago her father died. Within six months sordes appeared on her teeth; it was barely perceptible, for she takes most excellent care of them. The collection disappeared about six months later. About three years after she lost her father, her mother died also. Sordes appeared again, and ceased accumulating as it had previously.

Many of you will remember that a well-known gentleman, the agent for a European line of steamers, was riding in Central Park a few months ago when his horse slipped and fell on him, crushing his life out. He was engaged to be married to the lady mentioned, the wedding to have taken place this autumn. Now she has sordes in abundance, in spite of her uncommon neatness, with one of the largest scarlet lines near one of her teeth I have ever seen.

The termination of this first stage, when the disorder is persistent, is by the absorption of the scarlet tissue till the pericementum is reached. If the patient can be persuaded at any period of its progress to keep the teeth quite clean, especially their approximal surfaces, and to give the sympathetic nervous system some relief by moderating the use of stimulants, recovery will take place with a reproduction of the lost tissue. Otherwise the gingival borders become rounded; not by infiltration, however, but only by the loss of their margins. A better lodgment is afforded for the collections mentioned, and the difficulty of removing them correspondingly increased. It will be remembered that in the vast majority of cases the disease terminates here spontaneously, it appearing as if nature came to the rescue by diverting nervous force from some neighboring part. This was the view taken by me till the real character of sordes became known, when it had to be modified to some extent, so far as clinical evidence is concerned.

It seems that this should have been suspected when I found that the trouble was so easily controlled by antiseptics, but micro-biology was in too rudimentary a condition at that time for therapeutics to be based intelligently in all respects upon it. We only knew that, under certain circumstances, certain agencies were remedial, and they were employed quite empirically.

It is doubtless true that there is a reinforcement of vital energy often, and perhaps always to some extent, furnished to tissues that are pathologically affected. This was probably the case with the two elder of these sisters, for the sordes that affected their gums at times was quite harmless, at others the injury taking place when their condition was, to all objective evidence, the very best.

One of the most plausible theories of which I have ever heard is that an increase of sympathetic functioning in one place can be caused by rendering it unnecessary in a neighboring one, and we are not without some kind of evidence that this is the truth. In the case of an accident of a grave character, one likely to prove fatal, emesis and the cessation of peristaltic action occurs, and other viscera than the prima viæ may yield up a part of their energy and cease their activity for a while. This seems to prove it true that vital force may be transferred from one to another part of the system. There is too much evidence of the accuracy of this theory for any doubt to be entertained about it, and it has been adopted by the intelligent members of the medical profession.

But let us look at this question rather more critically. That which a living organ may and does do we may not expect from a dead or absent one. Were this the case we might increase the power of one arm by amputating the other, or that of the legs by sacrificing the arms, or *vice versa;* or we might treat mental weakness by such amputations. The destruction of one tissue, therefore, as a therapeutical means for a pathological neighbor would only result in a cessation of their interdependence and their powers of mutual aid, should such exist. Had this any result it would therefore fail to be the one anticipated, and any benefit to the affected tissues which occurred simultaneously would be adventitious.

The occurrence of this scarlet line is, so far as predisposition is concerned, due to the impaired resistance of the part affected and its contact with "sordes." This change would be a mystery were it not for the discovery made by Dr. J. Leon Williams, of London, England, that this viscid, pearl-gray substance, which takes advantage of our misfortunes or misdeeds to pay us its visits, is really nothing but a mass of micro-organisms, mostly acid-producers.

I am sure we all remember the brilliant and intensely interesting lecture which he sent over to be read before this society last January upon the subject of dental caries, as well as the one appealing to us to do what we can in the way of placing our profession on a scientific basis. I need say nothing, therefore, concerning the morphology of bacteria or fungi, nor of any of those peculiarities which have been attributed to them and explained by him. I shall only assume that they have the power to attack the gums when their vital forces are in a state of depression.

It can hardly be that the effect mentioned should be caused by the acids produced by the leptothricæ or by the cocci present if their abilities in this direction are dependent upon a slightly saccharine environment, for it is reasonably certain that the scarlet lines appear to form when no such environment can be possible. The results of my own experiments about this were negative.

This necrotic disorder is the only one, with a single exception, among those periodontal troubles with which the dental surgeon has to deal which I believe has an inciting cause in microbic attacks solely. Micrococci may be present in some of the types which are more properly termed "chronic alveolitis" than is our subject, but only as accessories. This is notably the case sometimes in superficial calcic alveolitis, where the scarlet gum-margins alluded to are occasionally quite conspicuous. This must be, I think, pathognomonic of the presence of these micro-organisms. It may be that there are other agencies to which assistance may be attributed, but I am inclined to consider this very doubtful.

The leptothricæ and the acid-producing bacteria may well be expected to produce some other substance than lactic acid under some other environment than a saccharine one. We shall see that this is probable.

The subject of "inflammation" was referred to as being one to which allusion would have to be made again. We have all probably heard these scarlet edges called "inflamed gums," even if we have not done this ourselves. I know I have spoken of them in this way. Under present circumstances, however, a dental surgeon may be expected to make similar errors. The scarlet color of the gums is really due to erythrocytic diapedesis, the dissolution of these cells, and the dispersion of their hemoglobin through the tissues composing the gingival borders.

The physiological reason why the red blood-corpuscles leave their vessels is for the destruction of some adventitious poison *by oxidation.* Were it some systemic poison that had to be removed this would be accomplished by the agency of the lungs changing it to carbon dioxid by the oxygen of the air, or the diapedesis would be that of the leucocytes only, when inflammation and hyperpyrexia might be present. Consequently the scarlet color, with no hyperemia, is pathognomonic of either bacterial invasion or the attempted absorption of bacterial poison or that secreted by leptothricæ. Now, if this toxin were of the nature of an acid, it would not require oxidation, I fancy.

It seems to be evident therefore that we really have in sordes, both by clinical and subjective evidence, the real exciting cause of this first stage of a disorder that will, if it persists, terminate in necrosis of the alveolus. Since the fungi and cocci concerned can only furnish acids when they have a slightly carbohydrate environment, and that an environment of this kind is quite out of the question constantly and entirely around every tooth in the mouth sometimes, it cannot but follow that the micro-organisms comprising sordes must furnish toxic matter of the nature of which we have never been informed as yet.

The second stage in the history of our subject is an interesting, but still puzzling, one to me; not as to clinical demonstrations, for they are commonplace enough, but as to the precise manner of their causation. Up to this time we had to deal for the most part with facts which appear to be indisputably such, but now we must have more or less to do with uncertainties. Certainties are to be sought among the rubbish of deductions, surmises, and inferences. Conclusions reached here, therefore, may leave something to be desired, but I beg leave to assure you that any clear evidence that may be adduced by my brother practitioners that they are improbable in any respect will be very willingly accepted by me. The reason for dealing with uncertainties is that the progress of the disease cannot be watched now, except in respect to the recession of the gums, because they conceal the other periodontal tissues until its last stage is reached.

I have never felt at liberty to open the gums to see just what was going on around the edges of the alveolus, but have until recently attributed their disappearance to the ordinary causes,—viz, malnutrition, molecular death, and absorption. But, since we have been informed by Dr. Williams as to the real nature of sordes, it seems necessary to modify this opinion. Formerly it did not appear to be possible to connect sordes with this stage of the disease without attributing to it qualities of a remarkable kind. It was certainly known to have such qualities to some extent, because neither the first nor third stage can exist without its presence; but in the second this substance cannot, as such, come in contact with the pathological tissues, it being excluded, as was just stated, by the gums. Still, it seemed impossible to exclude it altogether. The theory was then adopted that it must be forced between the gums and roots in masticating food, but this is contraindicated by the fact that recession is fully as likely to begin over the septa as it is anywhere else on the alveolar margins. So this second stage was remaining a mystery until Dr. Williams let light enough on it so that a reasonable hypothesis can be formed.

At present the micro-organism theory seems to fit or account amply for all the exigencies of the case, provided we attribute to the fungoid element of sordes certain traits and qualifications which have not as yet, so far as I am aware, been discovered in them. We certainly possess the strongest possible affirmative evidence as to the probability of the position assumed here in the efficacy of antiseptic treatment, and this seems to me to amount to absolute demonstration.

The acid-producing element of sordes requires, as stated, an environment of a certain nature for the formation of acids; hence the scarlet line is not the result of an infusion into the tissues of acids. But, granting that it is, what is it that destroys the periosteal and osseous ones when the saccharine environment is absent, as it must be in this second stage? Streptococci are excluded on account of the absence of the inflammation their presence incites, and the staphylococci equally so from the absence of pus, although some of our members are still calling this disease "pyorrhea alveolaris," or by a name which indicates a syphilitic origin, when pus would be present.

All this leaves the leptothrix racemosa under suspicion of being the possessor of some undiscovered means of inciting the dissolution and absorption of the tissues involved.

This stage is invariably recovered from by the abandonment of any habit which excites or produces a tension of sympathetic functioning. Such recovery, however, takes place slowly, but is as permanent as is the relief afforded the nerves. It may be rendered much quicker of occurrence by keeping the alveolar edges aseptic.

The beginning of the third stage takes place when the periosteal tissues have disappeared to such an extent that the edges of the alveolus, which the gums can no longer cover, must be removed by exfoliation instead of resorption. Now we have true necrosis of the alveolus, or, as Sir James Paget terms it, "quiet necrosis,"—*i.e.*, where there is neither inflammation nor pus.

The periosteal tissues disappear now much more rapidly than they have hitherto, and soon comparatively the alveolar edges are standing alone. This stage of the disease was so accurately described by those who spoke about it at the meeting referred to that I am sure you are all familiar with it. But there are some features yet to be mentioned, and these can be quickly disposed of.

One of the gentlemen who spoke mentioned the fact of finding and removing a sequestrum. I believe it is rare for any of us to see these sequestra, for the periosteal tissues release them so soon; and they are not likely to attract the attention of those who have the disease, so as to cause them to consult a dentist. Still, they are to be seen, and ought to be removed as soon as they are at all loose. I think we will be disappointed in looking for sequestra without having kept the necrotic tissue aseptic for a long time, or unless a really restored nervous functioning has been experienced. It is certain that when a tooth loosens and is extracted on account of this disease there is a gradual disappearance of the affected alveolus, with no exfoliation. I think if those of us who have removed sequestra will take the trouble to inquire into the constitutional conditions which were present at the time, we shall find that a marked improvement had taken place a short time previous.

This disease has been spoken of here only when it is free from complications with staphylococci or streptococci, although both must have been present in the sordes. I have never seen it when either of these cocci gave evidence of its presence. The systemic conditions have seemed to favor their invasion, but if we are really dealing with fungoid micro-organisms there must be some reason why the toxin furnished by them inhibits the activity of the cocci. As for streptococci, if I remember correctly, they cannot, unassisted, penetrate an epithelial surface. Still, such invasion is possible, however, if the way is prepared for them. I have just received a minute description of a shocking case where both these microbes were undoubtedly involved. The instance was where an abscess had formed on the roots of an upper bicuspid. Upon opening the pulp-cavity, although the roots are said to have been filled, the evidence of complicated necrosis soon appeared.

The alveoli of seven teeth, the turbinated bones, and both antra became involved. There were ten or twelve cloacæ discharging pus and sequestra.

The case was reported to me by Professor De Ford, of the Iowa State University, under whose skillful management it is recovering as rapidly as one could reasonably hope for, only one cloaca remaining open, and its discharges diminishing from day to day.

The local treatment of alveolar necrosis is so exclusively antiseptic that little needs to be said about it. Applications of a two per cent. solution of carbolic acid are indicated, but they must be thoroughly and frequently made. But permanent recovery cannot be relied upon if sordes is still forming and the systemic condition previously mentioned is persistent.

It is seldom that a dental surgeon is able to effect the change in a patient's habits, which would cure the disease if it were an uncomplicated one. His physician's dictum will be sought, and is certain to prevail, although I regret to have to make the uncharitable remark that this dictum is very commonly more representative of the patient's inclinations than of his interests. It is true, of course, that the responsibility of regulating the patient's diet, habits, and customs, so far as these relate to his physical condition, belongs to the physician, and should be undertaken by him exclusively. But the mouth affords many diagnostic resources of which the physician sees little and knows less. It is true he places reliance upon the condition of the gums in acute diseases, but the gingival tissues give us wonderfully accurate indications of constitutional states, but to which no attention is ever paid by medical men.

It is most regrettable that our colleges should not pay more attention to instructing pupils in at least the elementary or fundamental principles of pathology than has ever been the case as yet, except in the New York State College of Dental Surgery, which had, unfortunately, only too short an existence. If only the basic principles of pathogenesis and general physiological functioning were taught, we would never see in our journals nor hear at our conventions and society meetings evidence of hypotheses among us which can have no possible justification in fact or fancy. This course would lead up to the correct understanding of periodontal pathological states, and the world will not forgive us much longer for neglecting to give students of dental surgery a thorough course of instruction in this most important, but totally neglected, branch of our profession.

A PROTEST AGAINST SOME OF THE BARRIERS TO PROGRESS IN THE DENTAL PROFESSION.

BY J. A. LIBBEY, D.D.S., PITTSBURG, PA.

(Read before the Pennsylvania State Dental Society, July 14, 1899.)

IN one of the latest editions of the "Encyclopedic Dictionary" dentistry is defined as follows: "Dentist, one whose profession or business it is to clean, extract, or repair teeth when diseased, or to replace them with artificial ones when necessary." This definition, I am sure, was not written by a dentist, but by a man of intelligence to a high degree; a man of culture, experience, and observation, one who judges things as he sees them.

In the "People's Cyclopedia" is the following definition: "Dentistry, the art of the dentist, or that of treating disease in the teeth (dental surgery), and of replacing these organs when lost (mechanical dentistry)." It gives a long list of pathological conditions, and concludes thus: "In the United States dentistry is practiced most widely, and in a manner so artistic and intelligent that not only is the decay of teeth arrested, but where they fail totally, and are no longer serviceable, new sets, upper and lower, are supplied, on gold or rubber suction plates, etc., so perfectly substantial and so natural in appearance as to sometimes deceive the most experienced and to meet all the necessities of the wearers, so far as speech and mastication are concerned."

This latter was undoubtedly written by an American dentist. If I should ask this audience, "Which is the correct definition?" the answer would be unanimous that the latter was correct. If I asked the same question of the intelligent class of people, I am confident the great majority would concur with the former. I am reminded of the couplet of the Scotch bard,—

> "O wad some power the giftie gie us
> To sa' oursels as others sa' us,
> Twad frae mony a blunder free us, and foolish notion."

Let us look at ourselves as others see us, and see if we can find some good reason for the first definition. When I concluded to write a paper on this subject I had in mind one particular barrier to progress that I wished to emphasize. I shall make it the concluding one. Others forced themselves upon my mind, a few of which I shall allude to briefly.

There are two factors which do not always harmonize,—*i.e.*, the professional and commercial spirits, and I wish to call your attention to the abuses of the latter.

Within the last few years the manufacturers of artificial teeth have, for some unknown cause, made a radical change in their shading. When talked to in reference to it, they claim it is in answer to a demand from the dental profession; but, if this is so, I do not know or cannot understand from what class of the profession such a demand comes. The change referred to was the dropping of the former graded shades on the body of tooth, substituting one shade therefor. Formerly we could get a tooth with a light body and darker at the cervix; sometimes three shades, which was certainly a correct imitation of nature in that respect. The only explanation which suggests itself to my mind is that the manufacturer really desired to cheapen the cost of production; something that may be demanded by certain of those calling themselves dentists (which I shall designate as commercial dentists), but certainly not by the true prosthetic dentist.

True art is to hide art, but how in the name of common sense is it possible to hide art with the product that is forced upon us at the present time?

If we are to believe the claims of the manufacturers, and I think they are entirely reasonable under existing circumstances, they are manufacturing artificial teeth at little or no profit to themselves, owing to the very high price of platinum; and yet I cannot understand why they should continue to do so; and, if our other surmise is correct, that they should seek to reduce the cost of production at the expense of the natural appearance of the product, rather than raise the price to consumer, which is certainly the legitimate method of accomplishing the end desired. I am satisfied the professional dentist would not complain as to price should the product satisfy his demands and wants. But this would not satisfy the commercial dentist, who figures for the largest possible profit out of his labor and investment, regardless of anything else.

I would like to see every dental society protest against this evil, and demand at least as good color shades as they made ten or fifteen years ago.

Next we have the commercial spirit in our colleges. Certain preliminary educational qualifications are claimed by nearly all our colleges, but my experience on the State Board of Examiners confirms my opinion that about the only requirement with many of them is five dollars matriculation, one hundred dollars for each course, and thirty dollars for a diploma and the degree D.D.S.

The practitioner who believes himself to be a professional man, conforming as he thinks to the code of ethics, but who has never imbibed the fundamental principles of ethics,—*i.e.*, the Golden Rule,—can be found in every community. Crown- and bridge-work is one of his specialties.

Crown- and bridge-work is usually looked upon as an advance in dentistry. I think the abuses of it have overbalanced all the good results that have been attained. I consider it has been a barrier to progress, and here again we see the commercial spirit. I will cite a few cases. A gold cap put on a tooth, which should have been filled, simply because it was easier to do that in the way it was done and a larger fee obtained. I have frequently removed gold caps from molars and bicuspids and filled the teeth; the caps were usually made of gold no thicker than 34 gauge. I have seen approximal cavities in incisors filled with cement, and a band of thin gold on the tooth over the fillings; I suppose to protect the fillings. I know of no other reason, unless it was the extra fee. In the city where I practice it is a very common thing to see glaring gold crowns in the mouths of the lawyer, the physician, the colored porter, the White Wings, the hod-carrier, the maid of all work, the well-gowned woman of fashion, and often of culture, and frequently in the mouths of dentists. I hope there are none here. This cannot be always charged to the young practitioner, but frequently to men who have been in practice for years, as well as to the out-and-out commercial dentist, who is in the business "for revenue only."

FIG. 1.

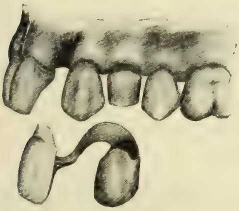
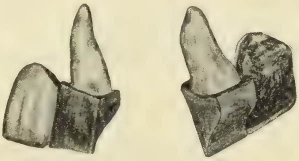


FIG. 2.



The colleges teach the students to make gold crowns or caps for cuspids and bicuspids, also open-faced crowns for cuspids as abutments for bridges. In examining the practical work of the students I nearly always find, if a cuspid is used as an abutment for a bridge, a gold cap or an open-faced crown is fitted over it, which I consider just about as bad practice. If the cuspid must be used, devitalize, cut it off, and put a crown on that looks like a tooth. I have three specimens I will illustrate. Fig. 1, a lateral incisor swung to a first bicuspid, causing it to become quite loose and decay of the cuspid where the bar or cantilever passed around until the pulp was exposed. Fig. 2, a central swung to a lateral root. The result was the loss of lateral root. This is a very good representation of the specimen. I have it with me, and will show it to any of you who wish to see it. Fig. 3 is a bridge from central root to second bicuspid. The lateral force and the curve at the angle of the jaw, with no support at that point, is sure to result as in Figs. 1 and 2, the loss of the roots.

Fig. 4 shows the natural form of a bicuspid and the form of the caps usually made, changing the direction of the masticating force, as indicated by the arrows. I am indebted to Dr. Grant Mitchell, of Pittsburg, for these illustrations.

These cases all show a lack of knowledge of mechanics.

If good judgment and honesty of purpose were used more liberally, there would be better results, and crown- and bridge-work would be a factor in progress, instead as I believe it has become, a barrier.

FIG. 3.

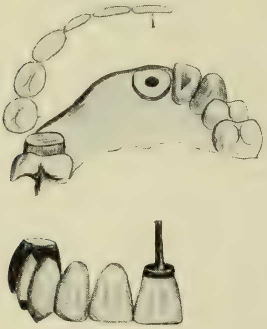
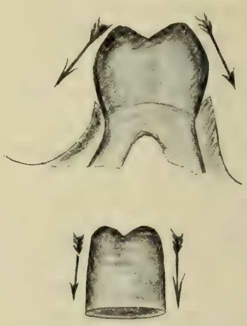


FIG. 4.



What we want to work for is higher preliminary education, a more thorough professional education. There should be no occasion for controversy as to whether dentistry is a "business or a profession." To do this we must change our degree from doctor of tooth surgery to stomatologist, or something else that will express just what we claim and propose to be; not only in spirit, but in truth, specialists of the healing art.

THE UNNECESSARY EXTRACTION OF THE DENTAL PULP THROUGH CATAPHORESIS.

BY E. A. BOGUE, M.D., D.D.S., NEW YORK, N. Y.

(Read before the American Dental Club of Paris, October 7, 1899.)

SIXTEEN or eighteen years ago Dr. J. Leonard Corning experimented considerably with the then new drug cocain, and succeeded in producing rather deep anesthesia with it by using the electric current to cause it to penetrate beneath the skin.* A few years later the process was reintroduced by Dr. Frederick Petersen, a nerve specialist, who gave it its present name of cataphoresis.

This process has been experimented with by several gentlemen of recognized ability, and it has been found quite possible for those having plenty of time at their disposal not only to remove sensibility in the soft parts, but also to completely anesthetize a tooth.

Let us examine some of the results arising from the use of the cataphoric current for the purpose of obtunding sensibility in the dental pulp, so that it may be extirpated at the same sitting. One of the gentlemen who has been most active in the introduction of cataphoresis to the acquaintance of dentists himself suffered from pain in a tooth. He resorted to his favorite dental operator; rather

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*See *New York Medical Journal* for November 6, 1886, and November 19, 1886.

a young man, to be sure, but one who had constantly upheld him in his advocacy of this method, and who owned one of these "intelligent" cataphoric instruments called a "volt selector." They selected a few volts, though it is not recorded that they used a water rheostat for accuracy; nor is it absolutely known whether it was the positive or negative current that was used in the process, for I find a statement in one of the electrical papers that this electrical specialist did not at that time know the difference between an anode and a cathode pole. However, a fair amount of insensibility must have been produced, for the young man undertook to remove the pulp bodily from the aching tooth. What the immediate result was I do not know, but a more remote result was a swelled face and an abscess, for which the gentleman applied to another practitioner for relief. This result shows conclusively that the pulp could not have been all removed, or there would have been nothing left to putrefy and cause the abscess; or else it shows that the gentleman who undertook to extirpate the pulp cataphorically passed through the apical foramen with instruments that were not sterile, which I presume he would not be willing to admit. A lady, a relative of the above-mentioned gentleman, also applied to the same operator, suffering from pain in a left upper molar which had been filled with amalgam for twelve or fifteen years. Again cataphoresis was used preparatory to the removal of the pulp. An effort was made to remove it, but difficulty was encountered in the buccal roots, which were too small to admit of easily working in them; still, the pulp was *supposed* to have been removed, and the patient was dismissed. Again great pain subsequent to this operation, then treatment for weeks of a tooth which had become excessively sore and painful to pressure; pericementitis, followed by abscess, and finally the abandonment of further treatment, and the extraction of the tooth after weeks of suffering. An effort was now made to insert a bridge to fill the space caused by the extraction of the molar. In some way the drills came so near the pulp in the bicuspid that this pulp also had to be destroyed. Finally it was found that an abscess had penetrated the antrum, and this required more weeks of treatment at the hands of another operator; and last of all a big bill for these various treatments and most valuable services from the gentleman who originally undertook to relieve pain in a molar tooth by removing the pulp cataphorically. The patient now has two pulpless bicuspids; one of them broken off in the effort to make a bridge, a vacant space where the molar formerly stood, and the remembrance of her weeks of treatment before the antrum could be finally healed, and a remembrance of the operator who caused all this suffering and loss that may be characterized by certain words rarely sought in the dictionaries.

Quite a number of practitioners have proved it possible, by taking plenty of time, to produce (as stated above) complete anesthesia in the tooth. When this anesthesia was produced they could, of course, cut where they pleased, and, as very few of our younger practitioners have had the time to carefully study the minute anatomy of a great many teeth, it is quite supposable that the little cornua of the dental pulp have been sometimes unintentionally cut into, at other times very nearly exposed, while the operator, as well as the patient, were in blissful, insensible ignorance of the fact. When sensibility again returns, that is to say if sensibility returns at all, the same conditions are found to exist as when we expose, or nearly expose, a living pulp that is not anesthetized. Pain is experienced, slight alterations in temperature are keenly felt, throbbing and a sense of pressure are frequently complained of; and not seldom the symptoms of pulp-irritation, and then pulpitis, strangulation of the pulp, its death, its very slow decomposition; and months, or possibly a year or two afterward, the truth of this diagnosis is proven by an attack of pericementitis, followed by abscess.

Thus much for cataphoresis as applied to dentin to obtund its sensibility. Dr. Thayer recently read a paper before the First District Dental Society of New York, in which he gave fifty-one cases of alleged pulp-destruction, accidents caused by the cataphoric current. Dr. Thayer has given me the addresses of the gentlemen from whom he obtained the statements and in whose practices most of these cases occurred.

Much is being written of late regarding the removal of pulps through cataphoresis without discriminating at all as to the teeth from which they are removable surgically, or by immediate instrumentation, which is a process that calls for careful consideration before it is employed. The English journals are already speaking of the danger line, and some of our more advanced American journals seem to be appreciating the fact that the galvanic current may, under certain conditions, do more harm than good. The writer read more than one year and a half ago of the application of the galvanic current to a tooth in which arsenic had previously been placed, with results that may be better imagined than described.

About the time that it was proved possible to render the tooth and its pulp insensible by cataphoresis, a certain gentleman advocated before one of the New Jersey dental associations the extirpation of the pulp for what were considered by some of his hearers very slight reasons, or no reasons at all. This gentleman stated that the office of the pulp was fulfilled when adult life was reached, and that its further presence in the tooth was, in his estimation, a matter of very little consequence. He proceeded, therefore, to advocate its extirpation in many cases where the more conservative operators would have carefully preserved it. So far as I know, no public reply has, up to this time, been made to this paper, and, as nothing has been said against his view, quite a number of operators may have been led to follow these unsound and unwise teachings. As so-called remedies generally appear for any great evil, about this time began to appear and be advocated numerous antiseptic agents, to be used as prophylactics against the putrefaction and decomposition of those remnants of the dental pulp that cannot be removed by any process, and those systems were very soon extended to embrace the whole, or the bulk, of the dental pulp, which, it was stated, could be mummified so as to give no further trouble.

Within about a year a case has been brought to my notice in which an effort was made to relieve pain in a nearly exposed pulp in a lower molar by removing it surgically by the aid of cataphoresis. An unmarried lady of good parentage, and no malign tendencies, had been for over twenty years in the hands of the same dentist. During that time she had never suffered from toothache. In the spring of 1898 a right lower molar was slightly broken, and the lady consulted a practitioner in a neighboring city, who, not recognizing the peculiarly delicate physique of the lady, repaired the break with a filling in the ordinary way. The operation itself was exceedingly painful, and the pain experienced during the return journey to New York was such that the lady telegraphed this gentleman, and he came several hours' journey to see her. He removed the filling at the lady's house, and, making an application of carbolic acid, instructed the patient to go to a colleague near by and have the cotton removed if the pain did not subside. As the pain continued during the next day, she went, and, being informed that the gentleman had dismissed a patient expressly to see her, she took his chair and was subjected to a cataphoric application of cocain to this lower molar. The pulp was rendered temporarily insensible, of course, and the practitioner undertook to remove it. So much as he could reach through the small openings that he made was probably removed, but when the effect of the cocain had passed it may readily be imagined that the remnants of torn and lacerated pulp gave no less pain than the exposed dentin had given, for the pulp had not been exposed at all until after the cataphoric application of cocain.

Upon applying to the same gentleman a second time for relief, another filling was removed from another adjoining lower molar. Cocain was driven into this tooth with the electric current, and an attempt was made to remove the pulp from this tooth also, which, of course, could not have been successful, as no instrument made by human hands can reach the entire canal of certain lower molar roots; nor can instruments reach the web-like portion of pulp-tissue that often in flat-rooted teeth spreads from one canal to the other, like the flattened web of a duck's foot.

Again, under the benumbing effect of the cocain, the patient returned home. When the action of the cocain had passed the pain that follows a lacerated pulp returned, and, of course, inflammation of that organ must have supervened.

At this stage the patient was taken to an oral surgeon, who made an examination by transillumination, and *thought* he located a dark shadow in the antrum, which, accordingly, he opened through the nasal passage on that side, evacuating something more than half a teaspoonful of what appeared to be pus or muco-purulent matter, though no accurate knowledge can be had of the matter, as no careful examination was made of it. Under the influence of this fresh pain the patient tried to rest content for a few days, but the generally neurotic condition was such that she went once again to visit the oral surgeon, and this time a perfectly sound and healthful upper bicuspid was extracted and a fresh perforation was made into the antrum.

In view of the artificial opening which had been made through the nares and the necessary admission of foreign substances, which would naturally cause the formation of pus, there was evacuated this time considerable pus, and some care was taken and some pain given in thoroughly washing out the antrum and getting it once more into an aseptic condition.

The pain still continued, and the next move was an opening (the father says) into the submaxillary gland, but at any rate down to the carotid artery, evacuating a small quantity of blood from beneath the surrounding fascia, for interference with the circulation in a painful region has been known to relieve or prevent pain in the affected part. Trousseau, of France, and Nussbaum, of Germany, have ligated arteries, successfully controlling pain by the process. In this case the pain seemed to subside for several days; not disappearing entirely, but being less severe. The subsidence was not for long, however, for very soon these two lower molar teeth began to be so very painful that, worn out by this long suffering, which had caused the loss of fourteen pounds in weight, the lady consented to the extraction of one of the lower molars, not the one from which the first pulp was supposed to have been removed, however. The operation was successfully performed, but little, if any, relief from pain was experienced.

Two other professional gentlemen were now consulted; the one an electrical specialist giving his attention largely to cataphoresis, the other a dentist giving some attention to oral surgery, and the treatment was to remove the pulp, or as much of it as possible, from the upper first molar, cataphoresis again being resorted to for this purpose. The pain still continuing below, an application of cocain every forty-eight hours or thereabouts was adopted as a palliative, in hopes of procuring rest for the sufferer. (No one seems to have thought of removing the gutta-percha filling put in by the first dentist who undertook to remove the first pulp from the lower molar by cataphoric help.)

At this stage the one who had charge of the lady's teeth during twenty years was consulted, "being asked if he knew anything about nerves independently of teeth," but he declined to hazard an opinion under the then existing conditions, not feeling himself competent to advise where so many others had failed to give relief, especially as it seemed evident that surgical interference would become necessary. At this time the pain was so intense that the screams of the patient at night were uncontrollable, and the constant continuance of the pain seemed to call for a surgical operation. Accordingly, a few days thereafter the jaw was opened externally and the inferior dental nerve was divided, and I am informed a portion was exsected.

After the wound of this last serious operation was well healed attention was again called to the immediate seat of the first difficulty,—namely, the right second lower molar, upon which the cataphoric current had first been directed, and from which the pulp was supposed to have been taken painlessly. A dentist in the country was requested to examine the case. His first step was to remove the gutta-percha filling inserted by the one who was said to have removed the pulp nearly five months previously. A little probing with so-called nerve instruments revealed the presence of living pulp in this tooth, which in turn was extracted. This tooth has been in my possession for a number of weeks. The drill hole into the posterior root is round and scarcely larger than the orifice of *one* of the canals that it was desired to clear out. The anterior root had been cut off before I saw the tooth. When I first saw it the pulp was still in it. This was several months after the beginning of the trouble, and during all that time this lacerated pulp continued living, and continued to behave like an exposed pulp, until it was discovered by the country practitioner who removed the tooth.*

The points to which I especially wish to call your attention are, first, that complete insensibility of the dentin in the small operations that we are called upon day by day to perform is not desirable. Unless a man is far more expert in minute dental anatomy than the majority of practitioners can be, he needs the guidance given him by a slight sensibility when he is excavating. All the obtunding that is required can generally be procured by the use of pure carbolic acid and cocain, followed by a crystal of zinc chlorid, if that can be allowed to remain ten minutes. For all ordinary cases cocain or eucain beta in ether, as it is now furnished, or pure carbolic acid, will be found amply sufficient.

Again, we are not authorized needlessly to destroy, and the destruction of a pulp or the extraction of a tooth needlessly is an acknowledgment *per se* of our inability to save; and unless the good to be obtained by either of these destructive processes, or any other, for that matter, is far greater than the loss to which the patient is to be subjected, we have no right to do either.

If a pulp is to be destroyed, it becomes us as intelligent and consistent dental practitioners to remember the anatomical construction of the roots of teeth in which these pulps reside. No man has ever cut open a large number of human teeth without being struck by the fact that there are great numbers of little canals occupied by the pulp into which no instrument can possibly penetrate. It is a perfectly easy matter to remove the pulp from any of the six front teeth surgically, and generally from the palatine roots of upper molars and from certain roots of lower molars and upper bicuspids. From all the others it is a decided question before beginning whether they can be reached at all, and if any one undertakes to drill these roots, and so enlarge them, he is pretty sure to cause the loss of the tooth so drilled. It may be regarded, therefore, as generally impracticable to attempt to *surgically* remove the entire living pulp from any save the six front teeth, for, although it may at times be done in other teeth, we cannot be sure of our operation. If it becomes necessary to extirpate pulps posterior to these six front teeth, arsenic should be applied, and allowed to remain several days. Unless there is special reason for haste, it should then be removed, and an application should be made of some antiseptic of sufficient power to harden the pulp, so that when the processes of separation between the dead and living shall have taken place at the end of the eighth or tenth day from the first application, this hardened pulp may be removed in one mass from the tooth in which the arsenic has been placed. If this be followed by an antiseptic dressing and a filling, whether of oxychlorid of zinc or of gutta-percha, or of paraffin, we need expect no further trouble from teeth so treated.

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*Since writing the above I have been consulted by Baron R., who presented a right lower molar from which he told me the pulp had been taken a year before. I found living pulp in both roots, perhaps half-way down from the cavity of decay toward the apices.

While it is true that the ancient Egyptians, as well as the Peruvians, mummified dead bodies, the climate and soil and surroundings of these mummies were never in a warm, moist mouth, surrounded by saliva and subjected to the vicissitudes of life. Those mummies dried up. So have many bits of beef and mutton that I have experimented upon, but let no one expect that the flood of life in the living animal is going to spare a portion that some dentist has undertaken in his crude way to mummify. It will return to plague him unless the patient leaves him or dies. We have all seen this exemplified in the operations of "the other fellow," whose pulpless back teeth are so constantly abscessing and being presented to us for treatment, while pulpless front teeth often endure while life lasts. What is the reason? Simply and solely because the pulp can be entirely removed from the front teeth, while they seldom or never can from the back; and the imperfection of the attempts at removal are evidenced later on by the abscesses which often necessitate removal of the tooth.

What conclusions, then, are to be drawn from the facts set forth?

The first is that the announcement of any man that a portion of the Creator's work is no longer of any use when a certain age is attained is presuming a great deal, in view of the finite character of the man's knowledge on the subject.

The recital of the three cases mentioned above from among the many cases that are now frequently occurring of needlessly trying to remove unexposed dental pulps is enough to show that a conservative line of practice is far better for both patient and operator; and while in cases of loose teeth, afflicted with pyorrhea and denuded of their natural gum protection, it may sometimes be desirable to lose the pulp rather than lose the tooth, such cases are not of very frequent occurrence, and when they do present themselves there is but little difficulty in deciding what should be done.

The second is that, in view of the anatomical facts (and facts cannot be controverted), it is utterly impossible to remove all of the pulp from many teeth.

Hence, until mummification can be positively assured for many years in a place as warm and moist as the mouth, nothing but urgent necessity should induce us to destroy a pulp, because it is, at the same time, a sentinel, warning against danger, and an unwearying worker for the protection of the tooth by the increase of its density within the dentinal tubes as time goes by.

Granting, however, that a dental pulp must be destroyed, the safest and surest way to accomplish its destruction in the molar and bicuspid teeth without ulterior consequences is *not* through cataphoresis.

Neither is it through the use of arsenious acid applied one day and removed the next, but by leaving it in place until the slough has taken place between the dead and the living portion, when the pulp will have no further attachment to the tooth, and can be more perfectly removed than by any other means yet known. The impropriety of relying upon mummification without removal of the pulp it would hardly seem necessary to refer to, and yet men who have gained some reputation as expert manipulators, rather than as learned physiologists or pathologists, have advocated this process almost with each succeeding generation of dentists, just as they have advocated cobalt for the destruction of the pulp while decrying arsenic, seemingly not aware that arsenic is found in cobalt, and is the active element in the destruction of every pulp destroyed by the use of cobalt.

Finally, all needed anesthetic effects for ordinary operations on the teeth can more quickly be procured by other processes than by cataphoresis, and unless we are very sure of our minute anatomical knowledge, cataphoresis will rather hinder than help the *busy* operator.

One of our safest operators says, "I am not using cataphoresis. I conducted a series of successful experiments about a year before Dr. Gillett read his paper, and intended publishing the results, when I discovered that Dr. Westlake had already experimented a year before me, and had brought out about all that has been said since on the subject.

"I succeeded in producing local anesthesia, but at the expense of so much fuss and bother and pain to the patient that I have gradually used it less and less, and have finally given up its use.

"A man who has enough to do cannot afford to bother with it.

"A neighbor asked me what I thought about it, and I told him if he wanted to advertise himself and have patients impressed to get an apparatus, but if he had anything else to do not to bother with it." To this I will add: For him who is not busy the doings of cataphoresis have been aptly described in one of the old nursery couplets,—

"For Satan finds some mischief still
For idle hands to do."

THE USE OF THE BLACKBOARD IN TECHNIC.

BY A. D. GRITMAN, D.D.S., BUFFALO, N. Y.

(Read before the Institute of Dental Pedagogics, December 27, 1899.)

THERE are as many ways of imparting information to others as there are senses by which we can receive instruction. We may convey knowledge by the sense of sight, feeling, smelling, hearing, or tasting. Some kinds of information are best imparted through one of these senses, and some by others. Perhaps the one most widely used is that of taste, which governs the selection of the food of many animals who are without any of the other senses.

There are methods of teaching human beings who are deprived of some one of the senses. When without sight, information is conveyed through the sense of hearing or the sense of touch, but there are cases in which an individual is deprived of the most of the senses. Laura Bridgeman, for instance, was inclosed within an impenetrable wall through which there seemed no opening. She had practically but one sense, that of feeling. Hearing, smelling, taste, and sight were either wholly absent or nearly so. This seemed a case in which it was almost impossible to educate, and yet by the persistence of one man this naturally very intelligent woman became comparatively well educated and accomplished, all her knowledge having been received through the sense of touch. So extraordinarily was this cultivated that she was able after it had been awakened to form logical conclusions drawn from a mere manual or digital knowledge of an object.

In human beings probably the sense of sight has more to do with mental development than any other. It is that upon which they must chiefly rely; not only to guard against injuries, but for investigation into hidden matters. Yet the power of speech, which appeals only to the sense of hearing, is that which was probably most early employed in the schools.

The ancient philosophers of Greece, who founded schools, and who were engaged in disseminating their doctrines, taught through the sense of hearing, their instruction being given in the form of lectures. Plato, the Athenian, founded a school of philosophy, and delivered instruction to his disciples in the groves of Academia. Aristotle was accustomed to lecture to his special students in the morning, and in the evening to a promiscuous audience in the Lyceum. Aristophanes, Diogenes, and Socrates appealed only to the sense of hearing. Although some of them wrote many books, yet their instruction was given in the form of lectures.

Modern methods of teaching are materially modified. For the very young text-books are provided and tasks must be learned, their intellect being cultivated through their sense of sight. In the kindergarten system of instruction the sense of sight is almost alone employed, the object being chiefly to cultivate a knowledge of form. In professional schools and higher universities the hearing is chiefly employed, and instruction is imparted by lectures, because it does not consist of axiomatic principles and arbitrary rules, which are the result of personal experience and experimental knowledge that cannot be embodied in any text-book. Professional instruction is continually changing with altered circumstances. No two cases in practice can ever present precisely the same conditions, and no two should ever be treated exactly alike. There is certain information which cannot possibly be conveyed by either sight or hearing alone. A union of the two becomes necessary to produce the best results. Object-lesson teaching has assumed very great importance, and is now very widely employed in almost all forms of instruction, especially where it is necessary to convey any idea in morphology. This method is adapted not only to older persons, but it appeals peculiarly to the young; and the kindergarten methods are simply a development of this form of instruction.

There are certain ideas which it is absolutely impossible adequately to teach to one who is without the proper sense, although another faculty may be so developed to take the place of that which is missing. A blind man can have no clear conception of colors, nor can a deaf man fully comprehend musical harmony.

It should be comprehended that a general education does not mean instruction of the brain alone. Especially to a man in our profession is education of the fingers of quite as great importance as that of the intellect. There are forms of manual training which are absolutely essential to the production of any good results in many kinds of study. For instance, the pianist must go through a regular form of instruction in digital discipline, and all children may, with a great deal of propriety, be trained in manual dexterity. American dentists have probably excelled all the rest of the world in operative work, because American children and Americans generally are especially trained in many forms of technics. We find among German dentists who are graduates of the universities probably the highest development of intelligence, but as a usual thing such men are very inefficient as operators. Their brain has been educated at the expense of their fingers.

The experienced teacher can readily detect the student who has had some form of technic instruction. In the present Freshman class of the Dental Department of the University of Buffalo there are three young men who at the outset showed unusual adaptability and readiness in the use of tools and an educated mechanical sense. They seemed at once to comprehend the result that it was desired to bring about, and to know how to produce it. They handled tools dexterously, and did not seize a fine carving instrument overhand, as if it were a pickaxe. They had that flexibility of the thumb which is only found in those who are accustomed to fine mechanical work. On inquiry it was learned that the father of one of them is a blacksmith, and the boy had passed his spare hours at his father's forge. Another had been employed as a needle-grinder, while the third had spent some time in a jeweler's shop. All these three widely varied employments had alike developed the mechanical sense and the technic ability sufficiently to place them decidedly in the lead on their constructional work.

Another student has always been in school, and is a graduate from a literary college. His parents are wealthy, and there has never been any necessity for other than mental exertions on his part. This young man has picked up his oral instruction with the greatest facility, and has quite taken the lead in such studies as anatomy, while it seems almost impossible to teach him the simplest elementary principle in mechanical construction. Although he is well informed in the laws of natural philosophy, what he really needs is a year in some employment which would develop his mechanical sense and educate his fingers.

In this country, as in most others, the digital training of women is usually confined to a very few pursuits. They become expert with the needle, but it is commonly remarked that a woman cannot drive a nail straight with a hammer. That is simply and solely because her manual training has not been in that direction. Certainly she has as much intelligence as man, but her technical work has not been the same. The boy is continually hacking something with a hatchet, or whittling out toys, or driving nails, while the girl is employed in stitching, embroidering, or in making dolls' clothes, in which she becomes expert, and which the boy would find beyond his manual capabilities.

In all the forms of manual training the sense of sight is of the very highest importance, while comparatively little can be conveyed through that of hearing. Words give no idea of morphology or of proportion, nor of the relation of one part to another. A lecture may impart definite principles upon which anything is done and the rules and laws which govern the application of those principles, but it cannot illustrate the methods of instruction. A teacher might lecture for an indefinite period upon the various forms of teeth. With most exact minutiæ he could describe the tubercles, the sulci, and the various lines without imparting to the student any clear idea of what one looks like, unless he had the object-lesson itself to show its morphology and appearance. He may even exhibit a tooth to a student and point out its various anatomical proportions, and thus convey a clear idea of what it really is; but the minuteness of the object allows him to present it to but one at a time, whereas the necessities of class teaching demand that he should be able to illustrate the same thing to a considerable number. Hence it has been usual for teachers who are instructing in tooth morphology to have large sectional models made, which may be exhibited to the sight while the lecturer is describing the various parts to the ear.

In teaching crown- and bridge-work, while a part of the instruction can be conveyed by lectures or through the sense of hearing, the main portion must necessarily be by object-lessons accompanying it, and even this involves difficulties. In making minute portions the parts are not large enough to give a clear comprehension of them. It would be impossible for the teacher to convey the proper meaning by saying to the student that he is to make a circular band. That is very indefinite. It gives no idea of the width nor of the proportions of the band which is to be constructed. On the other hand, he may exhibit the band already made and soldered, but that precludes the possibility of explaining clearly the different steps in its construction. Besides, the band itself is too small to convey a clear conception; nor will such methods of instruction give an idea of the proportions of the different parts, nor how they are put together. If a finished crown is exhibited to a student, that gives little knowledge of the method of its construction. It is necessary to show all the different parts. Yet it is not convenient to do this at times, nor are they sufficiently large to give that clear conception which is necessary to a complete comprehension. Besides, some teachers lack that ready flow of language, that copious vocabulary of words that enables them to give a graphic idea of any mechanical construction simply to the sense of hearing. Then, too, some students do not easily and readily comprehend the fine shades of distinction upon which all real artistic results must depend.

The use of blackboard illustrations in instruction supplements the other methods, and in many cases becomes of the first importance in conveying information. There are certain advantages possessed by him who can make a clear drawing of an object that will enable him to impress himself upon students more deeply than the most eloquent lecturer. For instance, different parts in the construction of any appliance before they shall have been united may be graphically placed upon the board, and their proportions pointed out. Then a drawing illustrates the union of the first two; then the addition of more, until finally the completed object is presented to the eye.

To convey the proper idea it is sometimes necessary to exaggerate a particular part. The real, true proportions would not properly illustrate the lesson which it is desired to impart. For instance, it is desired to point out to students the difference between the typical teeth found in the lymphatic and in the nervous temperaments. This, while plainly enough perceptible to the eye in nature, would be comparatively unmarked in a model which was the exact duplicate of the teeth themselves. To convey an impression of the difference it is necessary to exaggerate each peculiarity. This may be readily expressed upon the board.

Common defects very minute in themselves would not be made plain to the average observer in the object itself, but when a drawing of it is made and this defect exaggerated somewhat it is clearly conceived and guarded against.

There is one peculiarity in blackboard instruction which should always be borne in mind, and that is that the illustration always presents a flat surface. By showing the perspective it may be possible to give an idea of stereoscopic effects, but the picture is always a flat one. While this presents certain disadvantages, on the other hand it enables one to illustrate more perfectly an object by drawing upon a board a number of flat surfaces which, when joined together, will produce the completed object.

For instance, drawings will not at the same time present perfectly the labial and lingual sides of an incisor tooth, which a model may do, but the drawing of the labial side, when made, will more perfectly exhibit any special peculiarities through a little exaggeration of them than can any possible model. Then another drawing must be made of the lingual side, for the purpose of pointing out peculiarities on that. This necessitates two presentations, while the carved model requires but one; but each of these two, to the teacher who has the ability to draw clearly, is worth a great many models for the purpose of giving instruction.

Blackboard illustrations should always be combined with oral teaching to a certain extent. It is absolutely essential that the teacher should explain what he is doing in words which will convey his ideas. Blackboard illustrations can never be depended upon alone. They are imperfect by themselves, and require the lecture to accompany them for their full comprehension. Hence the blackboard is not a primary method of education, but it is an adjunct which supplies that which is lacking in verbal instruction.

In all forms of didactic teaching it is of the very greatest use. As I have already said, words cannot give an idea of morphology. The chalk very readily does this; but while the blackboard illustrates form, it cannot perfectly describe it. Hence the lecture and the blackboard should always be combined, and always go together. That didactic teacher who is not more or less an expert in drawing is to that extent unfitted for his position. If he is able graphically to place before his class an illustration of his idea he will impress his lesson a hundred times more deeply upon their minds, and the perfection of the teaching will very largely depend upon the perfection of the drawing, just as perfection in lecturing depends upon the command of the proper language on the part of the lecturer.

The teacher should endeavor to address himself to as many of the senses as possible. In technic instruction this is of the highest importance. Sometimes even taste and smell are required to give a clear idea of some particular object; especially is this true in teaching materia medica. It is the odor and taste which enable one to identify certain drugs, rather than their appearance or description. But, as I have already said, it is chiefly to the sense of hearing and seeing that the instructor must address himself. The ear has no conception of form or proportion, nor is it possible to convey a clear idea of morphology by words alone. This absolutely requires the sense of sight. On the other hand, the principles, and rules, and laws which govern the construction and use of appliances cannot be conveyed through the eye. They must be addressed to the ear. Practically, then, the technic teacher is required to convey his information through the two senses of sight and hearing. I have already shown that in some instances one of these is the more important, and in some the other; that neither can be dispensed with; that a perfect idea of any appliance cannot be obtained through one sense alone, and that the judicious and sensible teacher will group together the senses and address himself to any one of them which he can conveniently reach. If one would train himself for a successful teacher he must develop his capabilities in all of these directions. If he depends solely upon words, though he possess the eloquence of a Demosthenes, he will not make a successful teacher. If, on the other hand, he depends solely on the sense of sight in his pupils, while they may have a clear idea of the form and construction of an appliance, they can have no conception of its use. They cannot understand the rules and laws which govern its construction and its employment.

A knowledge of drawing is as essential to a teacher of technics as is language. The chalk in his fingers will speak louder than the words upon his tongue. If he is deficient in either of these methods of communicating information, just to that extent is he crippled in his vocation. If it is necessary that he should study physics and mechanical laws, it is just as essential that he should study drawing. He may not be a finished artist and he may not be a trained elocutionist, but he should know enough of both of these to be able to convey his idea through either the chalk in his fingers or the words upon his lips. Neither of these alone is sufficient, but both are essential. There are some objects concerning which one may speak for an hour without any ability to convey a clear, definite idea, when, with the chalk in his fingers, a few strokes are sufficient to express more than words can convey.

PRINCIPLES AND TECHNIQUE OF ROOT-PREPARATION.

BY H. J. GOSLEE, D.D.S., CHICAGO, ILL.

(Read before the Institute of Dental Pedagogics, December 28, 1899.)

THERE is probably no distinctive feature in the teaching of the subject of crown- and bridge-work that is of more intrinsic importance, that is more negligently treated, and that is more replete with attending difficulties than a consideration of the proper and skillful preparation of the roots of teeth for the purpose of restoring their natural condition by means of accurately-fitting artificial substitutes in the nature of crowns. I can, indeed, conceive of no other more important phase of the entire subject that is treated in such a perfunctory manner by the profession in general, and yet to this seeming indifference or negligence, wherever it may be apparent or manifest, can be attributed much of the trouble and many of the failures which must ensue.

The common cause of such failures and countless discomfitures in the shape of gingival inflammations and peridental and alveolar absorption can be almost invariably traced to the irritating influences of an imperfectly adapted band, due primarily to faulty root-preparation. And yet, since the profession has in the main agreed that the crown with a band, because of the additional protection and stability afforded, is the ideal crown, it necessarily falls upon us as teachers to take the initiative in endeavoring to correct the mistaken ideas, cultivate the field of errors, and place the proper significance and importance upon the requirements.

As the architect and builder intelligently and systematically prepares the foundation for that which is to stand as a monument of his skill, with the same care, precision, and accuracy must the foundation for work of this nature be prepared. Success in any line of mechanical procedure means method, system, a clear, concise comprehension of principles involved, and strict attention and adherence to the most minute of details. Particularly is this so where art and mechanics are merged together, and where the field of labor is confined to vital sensitive tissues.

While the requirements of a crown are fit, occlusion, and approximal contact, the first is the primary and essential element to ultimate success, permanence, and comfort, and is entirely dependent upon not only a conception of the underlying principles and a thorough execution of the details and manipulative procedure, but a knowledge and appreciation of the significance of their importance.

It is my purpose to so emphasize as to impress this upon us; to advocate that the importance demands a systematic and practically scientific arrangement of the subject, and, incidentally, to present to you a concise outline of the teaching methods I use and suggest in this respect.

That the subject may be best, and perhaps most easily and intelligently considered, I have decided it advisable to divide it into two general classes: Root-preparation—First, requirements; second, classification.

REQUIREMENTS.

This portion of the subject includes the necessary preliminary or primary procedure, and, consisting of three steps, is in turn subdivided as follows: Requirements—First, treatment, filling, and preparation of canals; second, restoration of continuity of walls; third, destruction or diminution of crown.

Treatment, Filling, and Preparation of Canals.—This consideration is given precedence for the important reason that it should invariably precede the sacrificing or removal of any of the remaining portions of the natural crown, because of the advantage thus rendered in the application of the rubber dam and the necessity for it, without which the facilities for the success of the operation may be materially impaired. The preparation of the canals will be subsequently considered.

Restoration of Continuity of Walls.—This second consideration becomes necessary only in those cases where decay is more or less extensive toward the cervical portions, and which, when accomplished, prevents the possibility of fracturing the remaining unsupported walls in the preparation of them, greatly facilitates the fitting of the band, and overcomes the probability of future decay because of imperfect adaptation of the edge of the band to the margins of deep cervical pockets. This procedure is of great importance in many cases, and can perhaps usually be best done with amalgam with the most permanent results.

The Destruction or Diminution of Crown.—This procedure especially refers to a consideration of the requirements which necessitate so shaping the remaining portions of the crown or root as to render possible the fitting and adaptation of a band to the constricted portion of the neck beneath the gingival border of the gum.

CLASSIFICATION.

In considering this phase of the subject we are, of course, governed by the particular style of crown indicated; and while crown-work is divided into two general classes, the shell or telescope and the post or dowel, the individual indications for a crown and the variation in the essential features of root-preparation require that it be considered in three general classes: Classification—First, preparation of root for shell or telescope crown; second, preparation of root for post or dowel crown with band; third, preparation of root for post or dowel crown without band.

For the purpose of illustrating the distinctive features and the requirements in these separate classes, I have had made a set of original models designed from actual measurements of typical tooth form, magnified twenty times in each diameter.

Preparation of Root for Shell or Telescope Crown.—Under this first class we of course meet with the most difficult operation, because of being confined to the posterior teeth; and most usually the molars, where it is necessary to secure a diminution of the crown dimensions at all points equal to the diameter at the cervix, and to sacrifice enough of the occlusal surface to allow for a reproduction of the cusps; while it is of course desirable to leave as much as possible of the remaining tooth-structure.

To secure this result it will be observed that at least the occlusal one-fourth of the crown must be sacrificed, and that one-sixteenth of the tooth-structures from each of the four walls must be removed in order that all occlusal dimensions may be reduced equal at least to the dimensions at the cervix where the band is to be fitted. The remaining "*stub*" will give a very lucid idea of the required diminution of the crown, and the thick edge of the sectional rim will clearly demonstrate the amount of tooth-structure sacrificed to secure this absolutely necessary preparation.

The absolute necessity for the removal of tooth-structure when an artificial substitute for the crown is indicated is at once apparent, while it is readily granted that the same entails considerable effort, and may require the destruction of the vitality of the tooth.

The question of the feasibility of devitalization in the great majority of cases enters largely into and is probably the most important phase of the subject in this connection. However, I manifest no hesitancy in saying that in a large proportion of cases between the ages of eighteen and forty-five or fifty it is impossible to secure a proper preparation of these teeth without so doing, unless the patient be made a martyr and subjected to the tortures of the Inquisition, irrespective of the oft-repeated theories of ultimate death from isolation, from the irritating influence of oxyphosphates or oxychlorids of zinc to the denuded surfaces of dentin, from the presence of metallic arsenic in the oxids of zinc, or from the effects of the inflammatory stages probably present and due to the influence of caries before crowning.

Any of these, or a combination of them, might well be expected to cause subsequent troublesome manifestations at some period, remote or otherwise, but the primary fact remains that so much tooth-structure must be sacrificed, that the walls of the remaining root must be parallel in order that a crown may be perfectly fitted.

Can this be accomplished when vitality is preserved? Would the patient tolerate the intense, excruciating pain necessarily produced by a perfect operation in the average case? Would the pulp survive the shock? The exceptions would be in abnormally formed teeth, in cases of faulty enamel formation, sometimes where there may be no adjacent or occluding teeth, and in those conditions regulated by age; but the exceptions do not affect the rule, and the principles are an important part in the consideration of the technique of the subject in general.

Preparation of Roots for Post or Dowel Crown, with Band.—The second class of root-preparation is of no less importance than the first, the indications being principally confined to the ten anterior teeth, and necessarily involve the destruction of the pulp and much tooth-structure, since the artificial crown replaces the entire natural one with the seam of union at the gum line.

After the treatment and filling of the canal, the technique of the procedure is as follows: The continuity of the remaining crown proportions should be destroyed, so as to leave the buccal or labial and lingual walls standing alone and somewhat unsupported by dentin. In the destruction of these walls it is necessary, then, to observe the precaution of preventing a rootwise fracture by cutting through the enamel with a thin knife-edged stone at a line which, it will be noted, approximates the cervical one-fourth of the crown, when each wall can then be quite easily broken down to this point with pliers or excising forceps, which leaves the remaining root probably a sixteenth of an inch longer than the gingival border of the gum.

This distinctive feature in the preparation of roots for this now perhaps most common style of crown is essentially necessary and should be invariably observed, because of three decided advantages: First, this exposed portion of the neck of the root greatly facilitates the peripheral preparation, in that the remaining ledge of enamel can be removed with ease and dexterity; second, it renders the securing of an accurate measurement a simple and easy procedure; and, third, the end of the root here remains to shape and guide the band in fitting it to conform accurately to the walls.

When the band has been thus fitted, removed, and cut down to the proper depth, this remaining portion of the root is then sacrificed with flat-edged stone or root-facer to the proper line.

It will be noted here that the face of the root when the preparation is complete is but slightly beveled, so that the labial or buccal surface is a trifle shorter than the gingival border of gum, while the lingual is a trifle longer, with the angle formed by the beveling a little to the lingual of the center of root, the reason for each being obvious, because the buccal or labial must be shorter than the gum in order that the facing may be placed in contact with it, and the cap practically invisible; the lingual should be longer to overcome in a measure the force of leverage in the opposite direction, which is especially indicated in the six upper anterior teeth, and the angle slightly to the lingual of the center to allow surface for the approximation of the neck of facing to the cap.

Preparation of Roots for Post or Dowel Crown without Band.—In considering this, the third class of root-preparation, it may be advisable to mention that while such a crown is quite often indicated, yet, regardless of the adaptation, it does not insure the permanent results afforded where the root is banded, the whole success of such crowns depending entirely upon the adaptation of the crown to the root.

The procedure up to the removal of the remaining portions of the natural crown is similar to or identical with that indicated in the second class, but differs from this point in the fact that *peripheral preparation* is unnecessary; and that in cutting the root on down after the removal of the crown a lingual bevel is necessary in order, by thus *saddling* the end of the root, to overcome the force of leverage in an outward or lateral direction, such as is sustained by the artificial crown in the act of mastication.

The labial or buccal edge should be carried slightly below the gum line for the reason indicated in the preceding class, while the lingual should be longer than the gum, so that the adaptation of the base of the crown may be closely observed and the seam of union or joint between the two rendered self-cleansing by being exposed to the movements of the tongue and action of the saliva; while the angle produced by this bilateral bevel should also be a trifle to the lingual of the center of the root, to leave surface room for the facing.

In those cases of extensive decay resulting in the presentation of a concaved surface to the end of the root, where perhaps a crown without a band is either the only alternative or most frequently indicated, it may not be possible to secure this desired form; in which instance it becomes necessary to secure a perfect adaptation of the base of the crown to the entire surface of the end of the root in order to secure the best and most permanent results, and which can be easily accomplished by means of impressions, dies, swaging, and burnishing.

Canal Preparation.—Since the post or dowel in the crowns designated in classes 2 and 3 plays such an important part in the retention and stability of the crown, it is necessary that some attention be given to the preparation of the pulp-canals for their reception. This consists in enlarging them sufficiently to receive a post proportionate in size with the diameter of the root and the requirements of the crown, which should fit at least two walls, extend into the root a depth equal to the length of the crown from the end of the root to the incisal or occlusal edge, and project through the cap far enough to the lingual not to interfere with the facing.

While there may be some slight variations in the consideration of this subject, they will probably be mostly of an individual nature, and yet come under the same general principles herewith outlined. And I have purposely avoided all reference to instrumentation as far as possible, because of the ingenious individuality usually displayed in the manipulative methods of accomplishing such procedure and of its being in itself exhaustive enough to receive separate consideration, attempting only to impress upon us as teachers the value and importance of the principles of root-preparation as being synonymous with success in this line of work.

SYLLABUS FOR DENTAL CURRICULUM.

BY FANEUIL D. WEISSE, M.D., NEW YORK, N. Y.

(Read before the Institute of Dental Pedagogics, December 28, 1899.)

I MUST preface the consideration by *me* of this subject with an apology for not being a dental surgeon. Thirty-five years' experience in helping to guide the evolution of the curriculum of the New York College of Dentistry is my excuse for venturing, in this presence, to express my views on the subject. In the fundamental medical departments we are on common ground, but in the dental departments I defer to the specialists in dental surgery.

I would here note that I have purposely avoided any allusion to the method by which the curriculum may be imparted to students. I have only epitomized the subjects that should be studied, giving the scope of each, to educate men for the scientific practice of dental surgery as a specialty of medicine.

The dental curriculum of to-day should include the study of the following subjects:

1. *Prosthetic Dentistry* in its respective fields of orthodontia and prosthesis.
2. *Operative Dentistry* in its respective spheres of extraction of and operations for the preservation of the teeth.
3. *Physics*—the physical and mechanical phenomena of matter and the forces which determine them, with a clear comprehension of the molecular physics of the materials used in, of the mechanical contrivances used in, of the mechanics of, and of the statics of the making of dental appliances and of dental operations.
4. *Chemistry*—the general laws of chemistry, the chemistry of the human body, and the chemistry of all substances, metallic and non-metallic, used in prosthetic and operative dentistry.
5. *Anatomy*—a general knowledge of the human body, and an exact knowledge of the descriptive and relative anatomy of the head.
6. *Dental Anatomy*—familiarity with the external forms, interior cavities, and cavity walls of the several teeth, temporary and permanent.
7. *Dental Comparative Anatomy*—a clear conception of the variations of the dental organs in the several classes of vertebrates.
8. *Normal Histology*—a general perception of all tissues of the body, and an exact perception of the developmental and mature histology of the tooth and its tissue environments.
9. *Physiology* of all the functions of the body, with particular consideration of the nutritive functions of digestion, assimilation, and disassimilation.
10. *Pathological histology* of diseased tissues in general, and a thorough appreciation of the morbid changes in the tooth and the tissues that surround it.
11. *Bacteriology*—the recognition of the bacteria found in the mouth, the laws of bacterial life, and the effect of bacteria in producing and carrying forward pathological conditions of the tooth and its root investments.
12. *Pathology*—the factors of tissue nutrition, the effects of

aberrations of these factors, the results of irritation of tissue as presented in the phenomena of inflammation, and the reparative processes of tissues.

13. *Oral Surgery*—the abnormal conditions, of developmental, traumatic, or pathological origin, of the buccal parietes, with their surgical treatment.

14. *Hygiene* of the body in general, and of the buccal cavity and teeth in particular.

15. *Materia Medica*—of remedial substances used in dental practice.

16. *Therapeutics* in general, and the special therapeutics of all agents, prophylactic and remedial, used in the local or systemic treatment of morbid conditions of the tooth and of the structures covering its root.

17. *Anesthesia*—the agents used for and the methods used for the production of this state, both local and general, together with all restorative measures to be resorted to in cases of untoward symptoms resulting therefrom. In connection with the subject of anesthesia, it is imperative that the dental student should be made familiar, by didactic instruction and personal appreciation on others, with the normal pulse, normal heart-sounds, and normal respiratory sounds, that he may be able to recognize the presence of variations from the normal, and in such instances decline to administer an anesthetic, local or general, without the concurrence of a physician.

I wish to make a special plea for the teaching of *physics*. But few of our dental institutions give the subject even a place in their respective three years' curriculum of educational work.

As a matter of fact, but few students enter a dental institution with a sufficient knowledge of physics to enable them to give the reason why a tool or instrument is made of iron, why a hammer has a wooden handle, or why a denture is held to the roof of the mouth.

Physics gives the reasons for the existence of every tool; as to the materials of which it is made, its construction, and how it fulfills its uses; and of every piece of apparatus, as to its material structure, its construction, and how it carries out the purposes for which it is intended.

Physics teaches the molecular forces that determine the properties of the materials used in prosthetic dentistry, and the laws which regulate the effects produced upon these materials in the application of forces to them. It is upon this knowledge that the prosthetic dental surgeon selects the materials and resorts to the procedures which enable him to carry out his work.

Physics guides in orthodontia; the selection of materials for appliances; the construction of the same, and the direction of force to effect given results.

Physics explains the reasons for the construction of the various operating instruments, the selection of the materials for the filling of teeth, and the results obtained by operative manipulations.

The so-called practical man may say to this plea for the study of physics, "I do not care for the how or the why! Give me the tools and apparatus, the materials and the practice, that I may obtain the results; these are all I care for!"

Such was the status of the dentist before the establishment of institutions for the education of men for the practice of dentistry as a profession. Dental educational institutions should see to it that such a status is not perpetuated at the present day.

To carry out the preparing of a "syllabus for dental curriculum" I would suggest that a committee of three be appointed to take charge of it, with power to appoint an editor from their number, to select collaborators of the several subjects, and to accept or reject the work of the collaborators. The editor to have charge of the final compilation of the accepted work of the collaborators. I would also suggest that the subjects be not worked out into questions, but that each subject be divided into detail heads, which shall present an analysis of the knowledge to be acquired.

OPERATORY METHODS.

BY W. H. WHITSLAR, M.D., D.D.S., CLEVELAND, OHIO.

(Read before the Institute of Dental Pedagogics, December 28, 1899.)

If the beloved Professor Chapin A. Harris were called upon to inspect our dental colleges, he would bless the men of to-day for their great zeal and for the wonderful progress they have made. Colleges are becoming replete with modern invention, for the scientific instruction in dentistry. The strain of the "survival of the fittest" is upon us, though new schools are constantly seeking admission to the realms of pedagogy.

Encomium upon encomium may be showered upon our directors and trustees for their successful efforts in placing within our reach, as teachers, the means whereby colleges may become perfect organizations. Nothing in this world is absolutely perfect, and this applies quite markedly to the dental college. All are lacking in proper financial endowment to establish chairs, which will enable creative geniuses to elaborate ideal courses of study and proper methods for their pursuance. No college will be complete until it can provide amply every facility for the advancement of dental science, with sufficient and competent "human tools" to enhance the *ensemble*. Until such time we can approach in a small degree only the satisfactory conditions that meet the approval of our higher ideals. Dental colleges, at present, are to a large extent dependent upon self-sacrificing men to promote their interests, these sacrifices not being comprehended by the profession in general.

The rise of dentistry has given an impetus to its every factor, and now mediocre methods have given way to systematic teaching, and the wheels of true dental teaching have begun to revolve.

For the purpose of learning and presenting some of these systems, it was my privilege to receive from thirty-five of our dental colleges generous and kind replies to a large number of questions, some of which, while seemingly insignificant, were used as leaders to glean ideas which might be useful to others, particularly in reference to the work of the infirmary.

Dental colleges in this country have operating rooms both large and small, containing from nine hundred and sixty to ninety-six hundred square feet, averaging from forty-nine to one hundred and fifty square feet for each operating chair. The shape of the room is usually rectangular, which seems to afford better facilities for light, unless situated at the top of a building and lighted also by skylight, when a square room is simply ideal. About two thousand chairs are in use in our dental schools, ranging from nine to one hundred and fifty in each, and used by seniors, juniors, and freshmen. With the exception of one, all schools allow juniors to operate, and one-third of our schools allow freshmen to do minor operations, such as the cleaning of teeth, etc. In a few colleges juniors have special chairs, one or two have special rooms for juniors, others alternate with seniors, or, juniors operate in the morning and seniors in the afternoon. In all colleges seniors operate, but in some their requirements must be fulfilled in January in order that the juniors may occupy the chairs the remainder of the session. This indicates a system of doubling which is *not* ideal. We believe that seniors should operate during the entire year, and each day in the session. While our colleges have chairs equal in number to but two-thirds the number of our seniors, careful management would enable each and every senior to have daily practice. An increase in the number of chairs in some colleges would make this method practical. Those in charge of the operatory find the numbering of chairs a great assistance. In our own school, where every senior retains his chair throughout the year, we have placed on the wall before each chair a neatly printed card containing the name of the senior, and patients often save time by inquiring for the student by name. In our opinion, juniors should operate, but admission to the operatory should be governed by the completion of their work in prosthetic and operative technics. Freshmen should not be allowed to operate.

Attendance in the operatory may be kept by the clerk or demonstrator, roll call, noticing absentees, attendance cards, which may be handed in to the clerk with student's own signature, or by attendance cards, punched by the demonstrator in chief. The amount of work accomplished, and not attendance, is the requirement of some colleges. The principal requirements of the operatory consist in the filling of teeth, their treatment, minor oral surgery, and dental orthopedics.

Most colleges require a certain number of fillings ranging from six to one hundred gold, six to fifty amalgam, five to fifteen cement, five to ten gutta-percha, and no more than fifteen tin fillings are required in any one school. Many schools do not require any tin fillings, which is, we think, a grievous mistake.

As a further requirement, treatment of abscesses, pyorrhea alveolaris, gingivitis, and a limited number of cleanings of teeth comprise the list. Satisfying demonstrators of their ability, or requiring students to do all they can, without limit, are methods pertaining to seniors in some colleges. One of the best systems devised for regulating the minimum amount of service in the operatory is known as the "Count System," devised, I think, by our esteemed Professor Black. It is based upon the value of "points." The simplest kind of a cavity filled means one point. From one to fifteen points can be gained by the operator in a single operation. To illustrate further,—approximal cavities in incisors and cuspids count from three to five points, occluso-approximal cavities in bicuspids and molars from five to eight points, and so on, increasing as the case merits skill and labor. The operation in each case is passed upon by a demonstrator, who issues cards to the students, which must be handed to the clerk of the clinic before credit is given for the operation. The full number of points required of the senior students in one school is one hundred and twenty-five in gold fillings and one hundred and twenty-five in amalgam. For the juniors, sixty-five points in gold fillings and sixty-five in amalgam. In another school two hundred points in gold and fifty in amalgam are the requirements for seniors. Fillings of other materials are gauged by number rather than by points.

A diversity of answers was received concerning our query as to how to prevent waste of materials. "Would like to know" and similar replies were given. One college provides bottles for the waste gold, and another deals it out in small pasteboard boxes, which are returned to the clerk with the remnants. Colleges which sell their materials to the students or patients before the operation avoid the waste, but at the same time give the student an opportunity to secure a fee for himself.

Capsules containing from five to ten grains of alloy subserve a useful method to prevent waste of that material.

A very practical economy in the use of medicines has been followed in our school by giving each senior, at the beginning of the year, a portion of each of the medicines most commonly used, he to provide his own bottles. We allow from two to four drams of each of eighteen different medicines, which, when exhausted, must be replenished at the expense of the student. The college medicine case contains a complete variety of medicines, adapted to special cases, which are furnished to the students upon application.

Systematic teaching, with a heterogeneous supply of operating instruments among the students, is an absolute impossibility. Uniformity of sets of instruments, well selected by the management of the college, is a necessity. To facilitate work the instruments should be numbered, so that demonstrators may save time by calling for them by number. They should also be numbered by the metric system, thus teaching form, size, and strength. Another advantage in the metric system of measurements of these instruments lies in the student's ability to secure exact duplicates from the manufacturer.

The extracting and surgical clinics are most frequently neglected, graduates often having had little experience in this important department of learning. To accomplish the teaching in this department satisfactorily, classes should be divided into sections of not more than three students. Each section does duty upon date of its assignment, and all cases presented during its service are property of the section.

By all means a skilled demonstrator should supervise this work, and no case should be operated upon unless he is present. In this way *only* can systematic instruction be given in extracting, surgical cleanliness, preparation of local anesthetics, and the use of general anesthetics.

An examination room, says one of our best teachers, is a necessity. It prevents interference with students who are engaged in operating, and it serves to facilitate matters.

Let me suggest that students, in rotation, perform this service as examiners in connection with the demonstrator, this service to constitute their whole duty on the days of their assignment. Provide a special examination chart to be filled out and duly attested before his demonstrator, which will also serve as a guide to the student to whom the case is assigned. This plan is now in operation in the college with which the writer is connected, and is meeting with much favor.

The assignment of patients is one of our greatest problems. This is done alphabetically, according to matriculation, according to the amount of work performed, according to the ability of the student for that special work, by the available students, and to those having the fewest counts. The work of assigning patients is performed by the superintendents of the clinic, or by demonstrators in whom should be embodied keen perceptions and acute intuition with enough strategic ability to keep the students in touch with their work. One experienced demonstrator can handle ten students entering the operatory for the first time, providing he has no other duties to perform, and, as their experience increases and they require less constant attention, he can increase the number to twenty-five.

In former years classes were more variable, but now flexibility toward the great purpose of our work is increasing, as higher requirements are made for entrance to our colleges.

Mention of the methods of keeping records of our work has been purposely omitted from this paper, because they can better be studied by a perusal of the various charts which have been mounted upon cards and placed among the technic exhibits. From these we can all see which method most fits the needs of our own school.

It affords me great pleasure to thank the various officials for their courteous attention in replying to my letters of inquiry, and I trust that the seed they have sown will bear excellent fruit, that the work of the operatory will increase in usefulness, and that through our conscientious efforts to systematize our teaching we shall elevate our chosen profession and send out into the world good, proficient dentists.

PROCEEDINGS OF SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, November 21, 1899, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city; the president, Dr. S. G. Perry, occupying the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. J. BOND LITTIG. I have nothing new to offer under this head. I have something to say which is not all new, although there seems to have been some conversation in regard to it here to-night, and some of the members did not know exactly what to do with a case of that kind. We were speaking of irregularities and the peculiar class of cases where there is an anterior protrusion of the upper jaw, where the teeth of the lower came in contact with the gum above. I said to them there was only one remedy for that, which would always be successful,—at least, I have never failed in such a case,—and that is simply to make a plate for the palatal surface, allowing the lower front teeth to strike heavily upon it, leave it in that position for six months, and you will have all the room you want. All you need to do is to make a rubber plate to fit the roof of the mouth. It is nothing new; you will find the device mentioned in the text-books. I have been doing it for the last fifteen years, and I always get the room I need in such cases.

Dr. O. E. HILL. Where the lower teeth strike the upper at the edge of the gum?

Dr. LITTIG. Yes; it makes no difference whether they strike the gum or the teeth. It will always give room.

Dr. J. F. P. HODSON. I do not quite understand Dr. Littig's absolute confidence in that method. I have tried it only once, and while it did make a space between the cutting-edge of the lower teeth and the gum, when they struck the gum fully, I found I had gotten that space, when I came to my measurements, by the pushing out of the upper arch, alveolus and all.

Dr. W. D. TRACY. In that class of cases where the space is so limited, by following out Dr. Perry's suggestion, I have been successful, to quite a degree, in using a jacket-plate which covers the articulating surfaces of the bicuspids. Opening the bite in this manner gives the molars an opportunity to elongate, and in a few months it is surprising to notice how those teeth will grow toward each other and keep the bite open. In a crowded upper arch, where there is not room for the retraction of the anterior teeth, it is sometimes necessary to remove a bicuspid on either side.

Dr. HILL. I do not see that we have arrived at any definite conclusion in regard to this matter, and it is certainly a very important one. By means of Dr. Jackson's method, it is easy enough to retract the upper front teeth; but it is a grave question how to deal with the lower front teeth when they complicate the situation by occluding at the margin of the gum and teeth above. I have such a case on hand in a patient twelve years old, where the first molars all hit, but there is a full sixteenth of an inch between the bicuspids. Without grinding off those lower front teeth, it is quite a problem what to do.

The PRESIDENT. My attention was called many years ago to the point made by Dr. Littig, from the observation of several cases of young children whose temporary teeth seemed to be very short, and in danger of producing a little later this very condition. For many of those cases I suggested rubber plates for either the upper or the lower jaw, so the temporary molars should strike on the rubber plate. It is surprising to see how soon the first permanent molars would elongate. If that is carried still further, until the second molars come, they will elongate also, and you will get in about a year's time the space you need. I have had many cases of that kind with great success. Dr. Tracy has seen a number of them besides those he has had under his own care. We are a little at a disadvantage in Dr. Littig having one class of cases in his mind, and Dr. Hill another. It is merely a lack of clear understanding of each other's position, a thing which occurs very often at meetings; it is difficult for gentlemen who are describing things which they see clearly in their own minds to make others see them equally clearly. I think I can see what Dr. Hill means, and I do not think it is quite the class of cases Dr. Littig has described.

Dr. HILL. No, it is not; that is why I questioned him.

Dr. BENJ. C. NASH. While I have had no personal experience with inlay work, I happened to see in Dr. Deane's office the other evening a fusing of porcelain over a Bunsen burner, using the low-fusing body furnished by the Consolidated Company. Dr. Deane had resorted to this on account of the frequent breaking down of his electric furnace, and it seemed to me that it was a satisfactory substitute.

The PRESIDENT. Was the matrix held in the flame of the Bunsen burner?

Dr. NASH. It was done quickly, and was a rather crude but effective demonstration. Dr. Deane first took a piece of platinum about half an inch square, and with a round-ended excavator pressed it into a piece of wax so as to form a matrix, and filled it up with the body. This he inverted over the Bunsen burner so as to dry the body gradually from edge to center. It was then held right in the flame, and moved up and down until the body fused. It had a nice glazed surface. Dr. Deane told me he had made an inlay in this manner that very day.

Dr. HODSON. We continually hear from those who use the high-fusing body and the platinum matrix of the necessity and propriety of putting the matrix into the cavity again for the second burnish after one fusing. It seems to be considered, without being discussed at all, that it is not possible to do that with gold, and I have often wondered why.

Dr. JOHN I. HART. I was under the same impression as Dr.

Hodson, until I made that statement in favor of the high-fusing body which I have been employing, and Dr. Ottolengui, who has been using the Jenkins body, asserted that he could replace the gold matrix after it had been baked, once or oftener into the cavity for trying-in purposes. I imagine he is able to do that by reason of using the asbestos powder in the dry form. I think he merely heats it in the asbestos in the dry form, so he can withdraw it without having it cling to it. I have tried both the high- and the low-fusing bodies, and I find that the low-fusing body does not give me as accurate a shade as the high-fusing body. I am inclined to think that the reason for this is that we may hold it in the flame to a given heat, and obtain the fluxing of that porcelain at the temperature at which they furnished it to us to flux, and then again we may hold it a little bit longer and modify the color. I returned to the high-fusing body, because I found I achieved more definite results. I find the platinum that The S. S. White Company furnishes, and that is now furnished by the Consolidated people, if annealed in the electric furnace, is every bit as soft as the gold that we use in making the matrix, and I think if we will follow out the suggestion made at the last meeting by Dr. Van Woert, of making an impression of the cavity in modelling compound, chilling it in ice-water and softening another piece of modelling compound and obtaining a counter, then pressing the platinum between those two before it is introduced into the cavity, there will be no failures on account of the breaking of the matrix. Making the dies with the modelling compound is only a matter of two or three minutes. The die will not stick if it is greased or vaselined.

I have had the same trouble we all experience in the burning out of my furnace, and Dr. Sanger suggested it might be due to the cracking of the fire-clay surrounding the wires and the rapid oxidation of the same. He said if I would protect the wires at the points where the crack exposed them, which show readily when the current is first turned on by the red glow through those points, I would have less difficulty. I think he uses kaolin. I mixed the powdered asbestos in alcohol, mixing it very thin, and with a soft brush wiped it over those points, and in about two months the furnace has not burned out at all.

The paper of the evening was then read by Dr. Henry S. Nash, on the subject of "Alveolar Necrosis." It is printed in full at page 408 of the current number.

Discussion.

Dr. Geo. A. Mills. The paper speaks for itself, and any man of intelligence can see that the one who wrote it has made considerable observation in the matter. While it may be possible, and probable, that micro-organisms have a great deal to do with the condition of which Dr. Nash has spoken, we must all bear in mind that health is a protection to all this. It only comes back to the thought that Dr. Williams mentioned, that *predisposition* and *en-*

vironment have to do with the whole matter. I can confirm what has been said by cases in my own practice, of the dire results in the mouth from the loss of nervous force from calamities or from anything causing great depression. Those things produce conditions by which the micro-organisms have a fertile field in which to work. I have several remarkable cases in mind. One occurred in Brooklyn, in 1877, where a woman lost her husband, her mother, and three children in six weeks. The disease, of course, had been in her mouth previously in its early stages, but these circumstances brought on an extremely rapid progress of it. Another case was that of an army officer who was employed in a laborious mental work. He was in a prostrated condition from this and from convivial habits also. All his teeth were affected, and many of them were lost.

Dr. M. L. Rhein. I am at a disadvantage in not knowing what to say this evening on this subject. The essayist has accurately described the already well-known form of neurasthenic pyorrhea alveolaris, and agreeing as I do with his etiological classification and with his outline of the clinical course of the disease, I find it embarrassing to take exception merely to his terminology. It is impossible for me to agree with the form of nomenclature described by the essayist. I came here this evening expecting to hear a paper on alveolar necrosis, and not on a type of pyorrhea, or taking the nomenclature described by the essayist, alveolitis,—or interstitial gingivitis, as described by Dr. Talbot. Personally, I do not like the term "pyorrhea alveolaris," but when the essayist read his last paper, I said I did not think that the term Dr. Nash suggested was any better. I prefer the term "interstitial" gingivitis. The term "interstitial" is better than "chronic," but neither "gingivitis" nor "alveolitis" may be correlated with the term "interstitial." Alveolar necrosis of necessity implies the formation and exfoliation of sequestra, for alveolar necrosis differs in no way from bony necrosis in any other locality. I am therefore astonished at the scanty attention Dr. Nash has given to this pathological process, both in his discourse to-night, and in his book. No less remarkable is the doctor's statement that alveolar necrosis is beyond the province of the dentist.

I am glad the doctor made that statement to-night, because I would like him to tell us why he takes the position that alveolar necrosis, such as we have always understood it to be, should not be treated by the dentist. In reading his book, it struck me that he put our specialty in a cowardly position,—saying that we should not undertake the treatment of any syphilitic necrotic cases that come into our hands lest we become infected. Syphilitic infection is no more likely than pyogenic infection, and both can be avoided by the exercise of ordinary attention to aseptic details. I cannot conceive how we as specialists can draw any such line as the doctor mentions, and say that this part of the treatment of the alveolar portion should not come into our hands.

I have very well in my mind at this moment a case of alveolar necrosis that resulted from a very peculiar clinic that was given some years ago in New York by a well-known exponent of porcelain work. By means of a laxity of attention to scientific principles, the gentleman in question ran a screw, intended as a support for a bridge, through the side of a root and anchored it to the extent of one-quarter of an inch in the upper maxilla. At that time I was chairman of the Clinic Committee, and was placed in a very unfortunate and unenviable position, when the patient presented herself in my private office with her mouth filled with pus. With very little effort on my part the sequestrum was removed, and is one of my curios at the present time, representing about one-quarter of an inch in each direction of a portion of the alveolar process, with the screw anchored firmly in it. This, gentlemen, was a case of true alveolar necrosis that I felt it my duty as chairman of the Clinic Committee to take every possible pains to keep in the hands of a dentist and away from the medical profession, both because it belonged with us and because at that particular time it was very imperative, for interested reasons and for the welfare of the dental society concerned, that the case should stop right there.

I am perfectly well aware of Dr. Frænkel's classification correlating disease of the sympathetic nervous system with a certain type of malnutrition as it does, and I favor Dr. Frænkel's views on this subject to a limited extent; but I take issue with the statement of the author, when he says that Dr. Frænkel's views are accepted by the medical profession. Dr. Frænkel stands almost alone in the position he has taken in this matter, and while he has put forth these views for a few years past, he has had absolutely no support by other neurologists. It is an instance of a man taking such an extreme view that it is almost impossible for him to secure the support of the profession.

In the particular type of trouble of which the paper treats, and which has certainly been described very fully, as far as what the gentleman calls the first two stages of the disease are concerned, the clinical symptoms are very well given, and denote a careful observation on the part of the essayist. The question that interests us, and about which I wish to say a word or two, is in regard to the remarks made so frequently by the president of this society as to the part that bacteria and micro-organisms generally play here.

The exciting causes in this condition are unquestionably the various forms of bacteria, and the fact has been thoroughly demonstrated that innumerable types of micro-organisms are capable of producing this form of destructive condition that starts in the accumulation of sordes. But as the essayist has also said, there must be a predisposing cause for the deposition of these sordes, and for the lack of vitality and of resistance on the part of the tissues surrounding the roots of the teeth. This is the main thing that interests us from an etiological point of view. It is not the exciting cause, because the exciting causes are present at all times, and in all mouths. It is impossible for any mouth to be free from a vast amount of these various types of micro-organisms, but as long as the patient is healthy, as Dr. Mills has said, as long as he enjoys an absence from the environment of some affliction, whether it is the kind illustrated by the author to-night, some affection of the sympathetic system, or some pathological condition of the neurasthenic type, it is impossible for these micro-organisms to do any damage. In the description of the etiology given by the author, and the clinical predisposing causes, I believe he has placed too much stress on the excessive use of stimulants,—not that there is not a large number of these cases of neurasthenic type where the extensive use of stimulants is unquestionably the predominating feature in the background, but it has been my fortune to see a large number of cases of this type where there has been an absolute abstinence from any form of alcohol, and a by no means excessive indulgence in tea or coffee. In fact, it may be said that in some cases the constitutional tonic treatment for the disease requires the use of alcohol and responds admirably to its use. Very likely the essayist is in thorough accord with me on this division of these neurasthenic cases into those due to stimulants and those due to other causes, and my only object in bringing it up was that I did not want the importance which he placed upon the abuse of stimulants to leave in the minds of the profession the idea that this is the predominating cause in all cases.

It is impossible, at the present time, unfortunately, to come to any agreement upon the nomenclature of this subject, with views as strong as the essayist holds. I have never found in any type of cases such as has been described by the author, or that we are considering under the description, any form of exfoliated sequestra. The author says that while he does not doubt small particles of sequestra are exfoliated, he has never seen them. I also have never seen any particles exfoliated, and I regard it necessary to see them before assuring myself that they existed in cases where there were not other distinct causes of necrosis besides the neurasthenia. This is probably the most unsatisfactory point with regard to the title that the author has given to his paper presented this evening.

Dr. Mills. I understand that there is a condition of necrosis that is not a necrotic condition at all. Dr. Nash has given us an intelligent idea of what my observation has fully confirmed. That is what we are dealing with,—a dying condition of the process. Whatever the etiology may be in regard to it, it is death.

Dr. Rhein. I agree with what Dr. Mills has said. There is no doubt that necrosis means death, and if we were to start to-day with a new nomenclature we could accept Dr. Nash's definition, but we cannot do it. The line of what necrosis means, in general surgery, is so well understood that there cannot be any variation from it. In necrosis death occurs "en masse" in bone, and sequestra are formed; in caries we have molecular death with a consequent absence of sequestrum formation. Had the essayist used the term alveolar caries, instead of alveolar necrosis, no possible exception could have been taken to his paper.

The President. Will Dr. Nash kindly close the discussion?

Dr. Nash. There is not very much for me to say. I would like to ask Dr. Rhein if he heard me use the word alcohol?

Dr. Rhein. You spoke of stimulants.

Dr. Nash. I did, but supposed all would know what was meant. The strongest stimulant we have to deal with in the pathogenesis of this disease is coffee; the next is tea. Alcohol is in no way connected with it. Since it is true that there is no pyorrhea alveolaris at all about this disease, why do you continue to so designate it? Another thing, Mr. President, as regards the nomenclature of this disease, I did not call the first two stages "Alveolar Necrosis." They lead to it, but do not include it. I do not wish to be held responsible for any such statement.

Dr. Rhein. You have never seen any sequestra exfoliated in this disease?

Dr. Nash. I have seen them about to exfoliate, but I never took one out. They have been taken out by mastication or in other ways.

Dr. Rhein. May they not have been lost by molecular absorption?

Dr. Nash. Molecules cannot be absorbed in a necrotic osseous tissue. When I saw the patients referred to they were there, but in a few days afterward they were gone. Mr. President, one of the speakers questioned the correctness of my observation that Dr. Frænkel's classification of all disease as functional or organic had been accepted by the medical profession universally, adding that "In fact, Dr. Frænkel stands quite alone in classifying diseases in this manner." The fact is that when Dr. Frænkel's article was published it was uniformly and cordially accepted everywhere. If I remember right, the first journal to accept his classification, or among the first ones, was the *Berliner Klinische Wochenschrift*. This was followed by the *Lokal Anzeiger,* the *Tagesblatt,* the *London Lancet,* and our own medical journals, the *Medical Record, Journal,* etc. You frequently hear of mention being made in meetings of medical societies of "functional" or "organic" diseases. *The Medical Record* of November 18, I think it is, has a fine article upon this subject. As for Dr. Frænkel's standing quite alone in this classification, the truth is that I am not aware that the classification was his work. The first article published on this topic was the joint production of two of the most eminent physicians in the world, Dr. Joseph Collins and Professor Frænkel.

Adjournment.

The thirty-third anniversary meeting was held January 16, 1900. At the afternoon session Dr. Joseph Head, of Philadelphia, read a paper entitled "The Shadow Problems of Porcelain Inlays," which, with the discussion, will be published in the June number of the Dental Cosmos.

The evening session was called to order at 8.30 by the president, Dr. W. W. Walker.

The president introduced Dr. A. W. Harlan, of Chicago, who read the paper of the evening, entitled "A Review of Recent Literature on the Loose Tooth or Pyorrhea Problem."*

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*Printed in full at page 401 of the current number.

Discussion.

Dr. Geo. F. Eames, of Boston. This is a subject around which many shadows gather; shadows from above, shadows from below, and shadows from the side, leaving us, in fact, pretty much in the dark as to the precise origin of the various symptoms loosely termed "pyorrhea alveolaris," for it seems to me that the various conditions are symptoms of a condition, rather than the disease itself; and it seems to me important, in speaking of any of the varieties of so-called pyorrhea alveolaris, to name just what condition is meant. Is it the kind characterized by a large, white, soft deposit near the margin of the gum, and extending downward toward the end of the root? Is it characterized by a hard, black, and thin deposit located anywhere between the gum-margin and the apex of the root? Is it characterized by a recession of the gum, no deposit around the root, no inflammation, and no pain, or by that condition in which there is absorption in an acute stage, discharge of pus, pain, and extreme tenderness?

Now, as to all these conditions, what is the cause, a local, a general one, or both? If we decide in any given instance that there is a local origin, we must first ask how this condition obtained. What is the local cause? Having discovered that, having removed it, why do we not get the desired result? Why should it occur again? The teeth and gums are usually in a normal condition when first erupted, and when they are finally extracted a deposit may occur upon the artificial plate which has been inserted in the mouth. What causes the deposit to begin; what is the first deviation from the normal condition in the former condition, and what causes the deposit upon the plate in the latter? I am on record as stating, and I believe, that the first or remote cause of nearly all, if not quite all, the conditions of pyorrhea alveolaris is constitutional, and clinical experience bears me out in this. If I were to demonstrate anything before you as to the expressions of a disease, I should endeavor to bring patients before you and have you see the mouth, so you would know exactly what I was speaking about. There would be no confusion of terms. I should give you a history of the case, outline the treatment, and state what the results have been. It seems to me that in this way only can we convey from one to another just what is in our minds when we speak of this or that variety of pyorrhea alveolaris. I am very sorry that I am unprepared to speak upon such an important topic, and that I have no conclusions at hand to give you as the result of what little work I have done in this direction, but I hope, Mr. President and gentlemen, that this will serve as a wedge which will open a little wider field of discussion.

Dr. L. D. Shepard, of Boston. I have a few thoughts to express, although I recognize that on this subject one should not speak before such an audience unless he has had opportunity to prepare his remarks carefully. In all my professional society work I have posed as the practical man, rather than the theoretical. I honor above words the men who burn the midnight oil in studying the abstruse underlying questions upon which all science is founded, but I have not had the leisure nor the inclination in my busy life to pursue such study, and have left that to others. In anything that I shall say upon such a question as this I must appear as the clinician, the man who in his work day by day has observed what is apparent to the eye and hand, and who has not gone into the deeper questions of histology and pathology. I am on record as speaking before this society about five years ago, when Dr. George Darby, of Philadelphia, read a paper on the uric acid theory, and if I had the volume here in which those transactions are recorded I would like to read my remarks on that occasion, for I am still firm in the views I then uttered. I remember that it was hailed in the profession as the dawn of a new era when the late Dr. Riggs performed in Greenfield, Mass., thirty-four years ago, the first public operation to demonstrate that this condition was in a measure curable. Since that day I have followed what was then indicated as a rule of practice. I have been a careful observer of conditions as they existed, and I have been forced to divide this question of loosening teeth into two grand classes, the incurable class, or the class which can be only approximately and partially remedied, and the other class, to which every human being is born, of total exemption from this disease, provided the proper measures are taken to avert it and prevent its occurrence. This perhaps would seem strong grounds, but it is a clinical view. I care little for the discussions of the scientist, except as they are valuable for teaching. For the good of my patient I take the ground that exempting certain of the conclusions which the writer has given, like loosened teeth from malocclusion, loosened teeth from injudicious extraction, as the extraction of two molars and the tipping over of the third molar, and similar cases which are partly mechanical, the tenth provision of the writer covers the case, and this disease is as much as typhoid fever and the allied diseases, a filth disease and entirely independent. I challenge, commencing with 1866 or 1867, the year I graduated, the production of a case of pyorrhea alveolaris or a loosened tooth from this condition in my practice among the patients that have come to me in their youth. I have had plenty of it in adult years. Dr. Riggs was in my office and operated on several cases about 1870, and from that day I have watched the cases; and I make this statement, that, as a filth disease, proper sanitation has enabled me to preserve the teeth of every one of my patients who has come to me in youth, and who has been fairly faithful in sanitation, which includes personal care and visitation to the office. That means people of forty to fifty years of age. I have been a very careful observer in this respect, and I am forced therefore to the conclusion that whatever effect uric acid diathesis or constitutional causes or heredity may have, in the hands of the thorough and conscientious dentist of to-day this condition is one which for the future should be considered only for the adults, but entirely avoidable by those who in their youth came under the care of a competent dentist.

Dr. Henry S. Nash. I regret very much that I was not here to listen to all of the remarks of Dr. Shepard, for I have never heard a more comprehensible description of certain etiological factors than the one which he has just given us. Dr. Harlan stated that I coin new words. The word "neurosthenia," to which he referred, has long been in use by the French and Italian physicians. Professor Frank H. Hamilton, the dean of the Bellevue Medical College, gave me that word, and I think no one will dispute his ability to judge about such things. My first case of periodontal disease, or alveolitis, was that of a young girl aged about thirteen years. Dr. Dunning placed her in my hands with the request that I give her disease as thorough an examination as I possibly could do, as well as all similar cases I could find. This I proceeded to do under the direction of the famous physician just mentioned. The particular disease which I was first called upon to treat was the idiopathic kind. In it there is no gingivitis, nor hypercementosis, nor calcic deposits whatever; no atrophy, no pain, and no lengthening of the tooth; and still in this case it was loose, and there was a copious discharge of pus. I submit to you that that was rather puzzling, and I do not think any one will blame me for seeking the aid of Dr. Hamilton. The circumstances I will not refer to, as they are mentioned in my work on alveolitis. There was a vast amount of new ground to be gone over before these diseases could be classified and mastered. I saw an almost infinite number of them, mainly at Bellevue. But to really comprehend them many consultations were had, and much learned which at that time was not found in a physician's curriculum. We must understand the anatomy of the tissues in which these diseases are located better than we do, their natural functions and their constituents, before we can settle pathological questions. We must know what produces changes in the blood and in the sympathetic nervous system which incites the functioning of the vessels that these parts contain. We must go even farther than this, and call upon the histologist for information about them before we can even name them intelligently. In respect to calcic concretions on the root, Professor Miller, of Berlin, tells us that they are caused by the tartar already on the tooth. What it really is that has been taken to be serumal deposits I do not know. It may be tartar which has been forced under the gum by mastication, or the hypertrophy of the cementum. I have heard both of these termed "serumal." As to the tartar under the gum, it is perfectly natural to find it there. I presume we all have seen it between the edges of the gums and the necks of the teeth in the first stage of its entrance, so the conclusion must, one would think, be self-evident that those deposits on the root are from tartar which has been forced under the gum through mastication, and are in no sense serumal,—*i.e.*, from a ruptured blood-vessel.

We seldom, if ever, hear of any rupture taking place in the muscular tissue. We do frequently in the soft adipose tissues and in the brain. In order for a serumal deposit to occur on the side of a root, the walls of those blood-vessels must partially rupture. Would any one think of rupturing a rubber tube by fitting it into an iron pipe and forcing into it air or water? It is just as unreasonable to suppose that the blood-vessels of the pericementum can rupture, packed as they are in that dense fibrous tissue.

Dr. B. Holly Smith, of Baltimore. "What is the most important question of the nineteenth century?" has been asked, and the fools have answered, "The most important question of the nineteenth century is, 'When does it close?'" I have heard the wisdom of this answer intimated whenever the subject that we have been discussing to-night has come up. I feel that Dr. Harlan is to be congratulated on his temerity in coming to this association, which has always been recognized for its vitality and courage, and reading a paper on this question, which is a living question to every one who practices dentistry. It is to me the most perplexing one with which I have to contend. I have no disposition to enter into the discussion of the name. I feel somewhat in the position of the father who sent his son to college, and after he had been thoroughly schooled and educated he came home to work in the laboratory of his father's pharmacy. He came to his father seriously objecting to the Latin used by the old doctor who practiced in the community for a long time. After much fault-finding and grumbling on the part of the young man, the father finally said to him one day, "Son, son, damn the Latin, but put up the prescription!" I feel it does not make so much difference what the men call it who are concerned in this investigation, if they would only give us some treatment. Let them call it what they will.

Eighteen years ago Dr. Riggs operated on my mouth for what he called "Riggs's disease." That is a good enough name for me, and I am satisfied to accept this, so that we get some rational treatment to relieve it. My treatment has been since that time the treatment I was instructed in by Dr. Riggs. I want to thank the gentleman who read the paper, because I have never had the courage to wade through all that has been written on the subject, and because he has given me succinctly and clearly the outline of what is in the books.

Dr. Jos. Head, of Philadelphia. The paper of Dr. Harlan is one of the most interesting I have ever heard. While I was listening to it an old motto came to my mind, "Who shall decide when doctors disagree?" When the classification of pyorrhea came up (and I hope if the spirit of Dr. Bonwill is near by that he will not come up and do anything to me) I thought of a case of his that I recently saw. Dr. Bonwill told me many times in private talks that he never had a case of pyorrhea, especially in his old patients; he got cases that came from outside, but he never had any in his own practice. About three months ago a patient of Dr. Bonwill came to me who had been under his treatment for thirty-five years. I noticed the beautiful gold work and the beautiful amalgam work, but what interested me above everything else were two very loose molars that Bonwill had told this patient he might lose. There was no pus about them, but you could wobble them around with your finger. I had a vague suspicion that it might be pyorrhea, but, not knowing what pyorrhea was, and never having been quite able to decide what condition would be called pyorrhea, and having forgotten a great many terms that would apply to it, I was unable to arrive at a definite opinion. Nevertheless, I came to the conclusion that it would be well if we could get down to some fundamental principle concerning this disease, rather than mere conjecture.

While a great deal of work has been done on the pyorrhea problem, most of it has been conducted on the principle of making a theory to which proofs were to be fitted. That has been a very interesting method, but the method of first hunting for a large number of reliable facts and from these facts deducing theory is perhaps likely to produce better results. For that reason I concluded to carry on some investigations at Blockley and other hospitals in Philadelphia, where large numbers of patients were at my command, the history of each patient being found at the head of his bed. In that way I hoped some reliable data might be obtained. I had been told that the French doctors generally believed that locomotor ataxia would cause loosening of the teeth, otherwise known as pyorrhea. I thought that was a very interesting statement, and, with a view of testing its accuracy, I went to Blockley Hospital, and a friend of mine, who is a physician in the wards, brought out thirty-five cases of locomotor ataxia. I examined their gums, and at the end of the examination I came to the conclusion that the next case of pyorrhea that came to my office I would inoculate with locomotor ataxia, because in each case that I examined the gums were almost abnormally developed and healthy. Since that time I have been looking up cases of Bright's disease and diabetes, and when I get through with these I intend to look at cases of pronounced rheumatism. I do not wish you to understand that I first go and examine a case and find loose teeth, and then hunt up whether the patient has rheumatism or any of those diseases. I take the diseases indiscriminately, as they come along, and then I look to see if the teeth are loose at all. After I shall have examined one or two thousand cases, which will take about two years, I hope to be able to say at least that such and such a condition does not of necessity seem to be associated with loosening of the teeth. I do believe that while working for theories may give us good results, working from facts for theories will give us better results. I have now a proposition to make in New York, and I hope Dr. Harlan will take it to Chicago. I would like two or three dentists in New York to do the same work in the hospitals here, entirely independent of my work, and independent of any work Dr. Harlan may do in Chicago, and let us tabulate fairly what the results are. Let us tabulate what percentage of locomotor ataxia patients have pyorrhea, let us tabulate what percentage of rheumatics have pyorrhea, and let us tabulate in the various diseases that are now said to cause these troubles what percentage of them are marked by loosening of the teeth. In that way I think some real scientific basis can be given for us to work upon. I do not speak of salivation caused by mercury, or of syphilis, or any low, wasting disease that we know causes such degeneration of the bony structure that any bone may become soft. I speak of those diseases that are common, that we ordinarily meet, and that are ordinarily said to cause the disease called pyorrhea alveolaris.

Dr. R. H. Hofheinz. In listening to Dr. Harlan's remarks I was reminded of our philosopher Emerson. He said he found a provision in the constitution of nature that from time to time great men were born, who are to put on record the doings of their time. He called the great German writer Goethe the secretary of the century. I feel like calling Dr. Harlan the secretary of pyorrhea alveolaris, and I hope he will follow up this line of study and give us the condensed form of all the writings on this subject. Dr. Shepard has come to the conclusion that filth pre-eminently causes pyorrhea. I will state a few facts which have occurred in my personal experience. I have in my own mouth, which was never filthy, except perhaps in very early childhood, before I knew how to take care of it, a distinct pyorrhea pocket on the mesial root of the first lower molar, which pyorrheal condition yields to nothing but proper oxidation when I am away in summer on my vacation. I have no other symptom in my mouth excepting that one on the mesial root of the first lower left molar, and it certainly cannot be from filth or lack of care, because it always has the best care I know of. I wish to report one case which I do not think is classified in anything Dr. Harlan mentioned, except it be heredity. I examined all the members of the family, the father and mother, and older brothers and sisters. It may be possible that there is an atavistic heredity, the same as in syphilis and other diseases, although I am not sure. This young lady, twenty years old, has not had a filthy mouth. She was not under my care except when she came home from school. She came home from school about two years ago with the first upper bicuspid very loose, and several other teeth attacked with typical pyorrhea. She remained under the treatment of her dentist at the place where her school was. She came back this fall, and I extracted the second bicuspid because it was so loose it became annoying; the root was almost entirely covered with serumal deposit. I sent the tooth to Professor Gieser, of Buffalo, and he found nothing except the ordinary deposits of lime and a trace of iron. I feel that, in spite of all the treatment I am giving locally, she will lose more teeth. She is under the care of the best physicians. Her blood and urine have been examined, and there is absolutely no systemic trouble that the physicians can determine. She has never had a sick day.

I have not found that extraction and replantation figure as a distinctive treatment in this disease. I will at some future date give you some startling statistics in that connection. I will only speak to-night of one case, from which I removed the splint just a few days ago. The two central incisors were extracted; one was so loose it was simply a nuisance, and the other was getting ready to drift into the same path. I scraped off all the deposit on the pericementum and replanted them. I was obliged in one case, because there was no osseous structure surrounding the labial part, to drill into the lingual portion of the socket, so as to get at least an osseous reunion at that point, which I did get. The one tooth is firm. The other, the lady says, feels, when she bites upon it, as if she were biting into the gum. It seems to me from that that there is only gum connection there.

Three years ago I extracted the first bicuspid of one of my patients who suffered from chronic alveolar abscess, the roots having been thoroughly filled years before with gold. I could not treat it in any way. I was in doubt as to the amputation method because the discharge was some distance from the apex. The lady was forty-nine years of age at the time. This was about two and a half years ago. I extracted the tooth, cleaned it, and replaced it, and had perfect success as to the replantation of the tooth; but the interesting feature is that since that time pyorrhea has developed on all the teeth in that lady's mouth, more or less, with the exception of the tooth which was replanted, where there is absolutely no pyorrheal socket and no discharge of pus. That makes it extremely strong, in my mind, that the disease is pre-eminently a disease of the peridental membrane, and with the destruction of the pericementum we get rid of the disease.

Dr. S. G. Perry. I am reminded while listening to this most interesting paper of a paper read a year ago in this room by Dr. Williams, descriptive of the conditions which produce decay of the teeth. Most of you remember the results shown on the screen at that time. Some day perhaps some one will illustrate examinations that have been made in reference to pyorrhea in the same definite and distinct way, and then perhaps we shall have some definite knowledge on the subject. Until that time comes, what we know must be the result of individual observation, and that accounts for the fact that one man says this is the cause of pyorrhea and the other says that is the cause. It is a matter of individual observation and individual cogitation while at work; not a very exact form of knowledge, and yet the most exact that can be had under the circumstances, made of value because of the good, old-fashioned New England common sense that some men have. I have had pretty strong opinions on this subject myself, yet what I say is only my individual opinion. I believe that this trouble is due to the presence of "bugs." Prove to me that germs in the mouth cannot cause all the conditions we see, then I will be ready to be convinced. Dr. Hofheinz has given you some important testimony just now. It is very significant when he says he replanted a tooth and it stood with no signs of pyorrhea around it, while on every other tooth were signs of pyorrhea. I have done that repeatedly. Is it not probable that that disease was due to such vegetable growths as you saw on the screen last year, springing up wherever the temperature is right, wherever a pocket is formed, working insidiously day and night? The case Dr. Hofheinz so clearly described is just in line with that idea. Why was Dr. Riggs successful in his cases for the most part? Because he broke up those nests and established a new condition by which there could be a new attachment, and the destructive influences caused by the vegetable growths under the gum were annihilated. My opinion is that Dr. Stewart's success in treating pyorrhea is due to the fact that he is so radical in his treatment. He forms new conditions by scraping the teeth so near their apices. Why will a tooth loosen and drop out, and the tooth next to it, under the same conditions of heredity, nutrition, etc., stand firm and strong? Is there any better way to explain it than that it is the insidious work of those vegetable growths? Lessened vitality—old age—is one factor, but not the most important one, in my judgment.

Let me tell you of a certain field that I remember, where I used to go hunting when I was a boy. Whenever I think of it I smell certain odors from certain sweet ferns. Just bear in mind, and think of certain breaths we smell in certain individuals, just as clearly defined as that fern in that country field, though not so sweet. Look into the mouths of those people and imagine a species of fern, or vegetable growth, that gives evidence of itself in that way. I consider that the implantation of teeth throws light on this subject. When you can prove to me that the germs in the mouth cannot cause those conditions, then I will give up my opinion. I have repeatedly implanted teeth by the side of, or between, teeth loose from pyorrhea, and had them become attached and firm, while the loose teeth remained loose. I have many times taken out loose teeth and put healthy, clean roots on them and put them back and had them do well. This is easy, because the rejected root is a perfect guide for size and length, and there is no trouble in attaching the parts with a metal pivot. Healing occurs before nests of germs can be established, and the result is what might be expected.

Dr. Wm. Jarvie, of Brooklyn. This to me is an extremely interesting paper. It is a vital subject, and it is just as perplexing as it is interesting and vital. I may say that it is none the less perplexing to me now than it was at the beginning of the evening. In my clinical study and observation of cases under treatment I have tried to discover the cause, and in classifying the cases I have thought that if I could only discover the cause I might discover a remedy that would be efficacious in at least a large proportion of cases. I came here to-night to listen to this *résumé* of the literature on this subject,—literature coming from the most eminent men we have, who have studied as deeply as possible this subject of the loosening of the teeth,—and I find the result of this *résumé* is that hardly any two of them agree as to the cause. We have heard the opinions of Drs. Miller, Williams, Nash, Talbot, Rhein, as well as Magitot, and the various writers who have been mentioned. One says that heredity is a strong predisposing cause, and the next one says heredity has nothing to do with it. Another writer says it is a purely local disturbance; then from others we hear that it is simply a local manifestation of constitutional disturbances. Dr. Shepard's close observation of many years is entitled to deep consideration, and I am glad he has been so successful in the treatment of the teeth he has had under his care for so many years. Certainly he has been much more fortunate than I have been with my patients, for I think that even in the mouths of those who have been constantly under my care for many years some teeth have been lost, and a great many teeth have been lost from the mouths of my patients who had been previously treated by other dentists. So, really, after listening to all that has been written and hearing all that has been said, I am still at a loss to determine the cause of this disease. But while I am at a loss to fix the cause now, I have hopes that the investigations which are going on and those which will be commenced later will result in finding the cause; and if we once know that, we can more intelligently and thoroughly treat the disease.

At times, as I am baffled over some severe and obstinate case, I wonder whether the loosening and loss of teeth in the mouths of people of fifty or sixty years of age is not frequently a physiological process, rather than a pathological one.

Children have not teeth at birth, and do not have them until such time as nature seems to require more nourishment than can be had from the mother's breast. As the child advances in age, and greater waste occurs, the temporary teeth are shed by the physiological process of absorption of the roots, and are replaced by stronger and larger ones, better fitted to triturate the food necessary to repair the waste of adult life. Later on, at the period when the activities of life are greatly lessened, the necessity of repair to the system is not nearly so great, and food requiring good masticatory apparatus is no longer called for, if not actually injurious.

In the light of these known facts, would it be altogether unworthy of our careful consideration as to whether the process of the absorption of the gums and alveoli, resulting in the loosening and loss of the teeth in the mouths of people of mature years, be not physiological, and one set up to rid the mouths of unnecessary organs?

Dr. M. L. RHEIN. A stranger coming here this evening and listening to the reading of the paper of the essayist would gather the opinion, manifested by many of the speakers, that we were greatly at loggerheads in regard to this terrible destroyer of the teeth of the human race. Now, gentlemen of the dental profession, that is not my opinion at all after listening to the very able *résumé* of Dr. Harlan. I think the entire disagreement on this subject has been due to the egotism of the scientist, and to a desire to protrude his own individual views on the profession.

Nothing was more deeply impressed upon me in attempting to elucidate this subject, as well as others presented to us as dentists, than the advice of a man whom the older men will remember as one of our respected teachers. I refer to the late William H. Atkinson. He used to advise all his pupils to avoid falling into this error of egotistical bias, but to study this or any other matter in an abstruse manner and to get at the truth if possible, irrespective of personality, irrespective of theory, and irrespective of what the results may prove. This has been my ambition as far as possible in an extensive study of this subject, dating back at least seventeen years. No one has influenced me more in studying this subject than that most respected teacher in dentistry, William H. Atkinson.

Mr. President and members of the Odontological Society, and visiting gentlemen, I truly feel that if all the men spoken of by Dr. Harlan in his paper, and those whom he said he would like to mention, would come together and, sinking their individualities, would compare their ideas and lay aside all feelings of personal bias, there would be such a concurrence of opinion on this subject that would surprise the dental profession to as marked an extent as they are perplexed regarding the question at the present time. I personally heartily indorse the views that Dr. Head brought out this evening. Those are the views that will lead to a proper elucidation of this subject. Nothing impressed me more in the discussion than Dr. Shepard's statements as to the personnel of his own practice. I cordially indorse the principle that Dr. Shepard so ably expounded, the proper sanitary care of the mouth as a preventive of this trouble, irrespective of cause. There is no question but that proper care exercised from childhood will prevent an enormous amount of this trouble. There are certain organic diseases, however, whose prognosis is absolutely fatal, and it is these conditions that set up a pyorrhea which stubbornly resists the most thorough and prolonged local treatment. We have here a pyorrhea which is uninfluenced by sanitary care of the mouth, and which is an indication of the approaching *exitus lethalis*. I illustrated a case of this kind in a paper read before this society some years ago, of a physician who took as good sanitary care of his mouth as any patient I ever had. His teeth came under my observation at a time when his mouth was in a healthy condition. He became infected with tuberculosis, and died within a year and a half of the original infection. He was my own age. He lived in Albany, and came to New York for consultation in regard to his illness some eight or nine months after the infection, and, as was customary, he presented himself to me to have his mouth examined. He was an intimate and dear friend of mine, who had followed my advice religiously in regard to the care of his mouth, and when I examined him on that occasion I was so affected by the condition of the gums and pericemental tissues that I was forced to leave off work, because I saw in his mouth a condition of true pyorrhea alveolaris so grave in its nature that I knew the end was not far off. He died within nine months, of miliary tuberculosis.

The point I wish to make is this, a pyorrhea that is merely the manifestation of severe and irreparable organic disease is most apt to resist successfully all our attempts to effect a cure.

Dr. Harlan in his *résumé* gave us only a few of the innumerable number of local causes which may produce a diseased condition of the peridental membrane of the gums and alveolus, followed by loosening of the teeth. Although agreeing with Drs. Shepard and Harlan that local treatment is sufficient to produce a permanent cure in such cases, yet we should not lose sight of the fact that all cases are not included under the head of simple, easily cured pyorrhea alveolaris. If you will allow me a moment or two further, I shall endeavor to clear up a point that seemed to disturb the mental acumen of some of the gentlemen this evening who listened to the different views and found them confusing. In my limited experience I have noted the fact that the symptoms in the mouth vary in different cases, according to the cause. The mouth looks different in different cases, and each author is apt to present the picture that has occurred most frequently in his clinical experience.

The point I wished to make clear is that if lead or bismuth poisoning, scurvy, rheumatism, or gout can be the predisposing cause of improper assimilation of food, or of a malnutrition which will produce a pathological condition around the roots of certain teeth, every organic disease that we are heir to will similarly produce a form of malnutrition, followed by circulatory and nutritional changes in this delicate tissue on which the stability of the teeth is dependent. We need a concensus of views of men who are willing, as Dr. Head has said, to tabulate, as far as lies in their power, the conditions of the mouth as they find them in diseases of a well-known type, preferably taken from large institutions where the course of the disease is carefully studied and mapped out, and where there is less possibility of an error as to the true diagnosis.

Dr. A. W. HARLAN. This is the first time in my life that I have listened to a discussion when a malady affecting the teeth and their sockets has been introduced by a paper and then discussed a whole evening without a word being said about treatment. I purposely avoided any reference to treatment in this review, because in most of the articles reviewed there was very little, and in Dr. Nash's book nothing, about treatment. Dr. Jarvie, I think, expressed himself as being as much in the dark as he was at the beginning of the meeting. The work of reading, sifting, and going over what has been written by Magitot, Witzel, Tomes, Wedl, Farrar, and numerous men whose names I did not mention, besides the half-dozen I did review, has occupied several months of my leisure time. I would have been much more entertained perhaps by reading Justin McCarthy's "Reminiscences of the Nineteenth Century," but I am so much interested in this subject, from the clinical standpoint, that much as I regret sometimes that I have to wade through speculation, yet I do it because I want to see if there is one little grain of truth in something that has been written. Dr. Perry, the honored ex-president of this society, stated his belief in reference to the causes of loosening teeth, and it seems reasonable to me to think that if we have a specific germ, microbe, bacterium, or coccus of some kind to produce diphtheria, and various other diseases of that nature, why may not a specific germ be at the bottom of this? Throwing aside all of the hereditary and constitutional ideas, may it not be true that it is a germ, and that it will be isolated; or there may be two germs, and that they will both be isolated; and, finally, we may be able to find a serum that can be injected and make us immune?

This is no laughing matter, because there are any number of diseases now where we inoculate to prevent the inception of those diseases. In the final summary I made at the end of this paper I did not give all the views of the various authors; some of them were my own. Perhaps when you read the paper you will discover which were mine and which were those of the authors quoted.

I am extremely obliged to you for your attention and courtesy, and if I have entertained you I am very well satisfied.

Adjournment. W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

AMERICAN DENTAL CLUB OF PARIS.

THE members of the American Dental Club of Paris held their meeting on the 7th of October, 1899, at the offices of Drs. Bogue and Roussel, 74 Boulevard Haussmann, when the folowing members and visitors were present: Members—Drs. Barrett, president; Du Bouchet, vice-president; I. B. Davenport, W. S. Davenport, Hotz, Bogue, Pousset, Brigiotti, Evans, Conrath, Spaulding, Gires, Roussel. Visitors—Drs. Dalton, Stevens, Meriam, Wetzel.

Dr. BOGUE. In view of what we were told at the last meeting of a method for the immediate removal of living pulps by aid of cocain introduced directly and under pressure, perhaps it is appropriate for me to read a paper bearing on the same subject. It has been noticed by every gentleman present that teeth without pulps are liable to fracture; more so than those which have living pulps, and that they become more brittle. As time goes on they also become less translucent; they sometimes grow dark in color, even after the roots have been filled, and even after fillings have been inserted in the cavities. They are more liable to disintegration. Every gentleman will assent to this, and yet we find within two years a long paper published in the New York *Items of Interest* advocating the destruction and removal of the dental pulp for very slight reasons.

Then, last Thursday night we were treated to another series of remarks in that same direction, as though all the teeth of the mouth had accessible roots. I have seen a little web-like stretch of pulp between two canals inacessible to any instrument. I have seen it so often that I fail to understand that any one who has cut open a few hundreds of teeth can venture to advocate the surgical removal of the pulps of back teeth. Such mischief came in one case that it sank very deeply into my conscience. Since then I have heard of two other somewhat similar cases. These three cases are detailed in the paper I am about to read, which was written in the hope of exciting a little further thought upon the anatomical construction of the roots of teeth.

The paper was then read.*

Discussion.

Dr. DU BOUCHET. I am reminded of the case of a lady who came to me during a summer visit to the Pyrenees with a lower molar in which the pulp was exposed. I dressed it with a little dry arsenical paste, and filled the cavity with gutta-percha. Three years later the lady called upon me in Paris. I found the gutta-percha filling had never been removed. Under it I found a brown pulp that had never given any more pain since the first application.

There is one important thing to remark; it is the ignorance of many practitioners concerning the anatomical structure of the tooth, due solely to the fact that the operator ignores the location of the pulp. If I were teaching a class of young men I should start them with making them open the teeth. I think then we would not have many future failures.

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*Printed in full at page 426 of the current number.

Dr. I. B. Davenport. Dr. Bogue has certainly done a good thing to call attention to this matter of trying to remove the pulp from inaccessible roots, a practice which is greatly abused, as the patients often are by the method. It is notorious to a good observer how persistent is vitality in very many lacerated pulp remnants left at the apices of roots, and which were thought to be all removed, or so little left as not to give trouble. And yet these terrible sources of irritation are often boxed up in several places in the same mouth, under big fillings and root fillings, in such fashion that it may be impossible to find the exact point of nerve irritation without removal of the teeth themselves.

I know of nothing more discouraging and distressing than the search for the cause of those agonizing dagger-stabbing neuralgias coming from the side of a mouth with a continuous row of gold in upper and lower teeth, all perfect in appearance, and the absence of knowledge as to which one or more roots had been most constantly sealed up with its contents only *sleeping,* while the operator was blessing God for the benefits of cataphoresis as a means of painless removal of living pulps.

There are cases where the immediate method of removal of a living pulp is of great necessity and advantage. It is only the abuse of the method and the growing tendency to abuse it that ought to be protested against. There is good in everything, and arsenic to-day is probably the best means we possess for the destruction of finely ramifying pulps in the great majority of cases.

Dr. Will Davenport relates the following: I had surgically removed a living pulp from a bicuspid for purpose of bridging, using cocain for the purpose. I was sure all was well removed, and under ordinary circumstances I would have filled the root at once. As I was to use the root next day, I left the canal with a dressing, upon removal of which I found a highly sensitive fragment of pulp still hanging at the apex. This would certainly have given trouble had the root been filled upon it.

Dr. S. E. Davenport contributed in writing the following: I believe that dentists and their patients are under obligations to Dr. Bogue for calling attention to some of the objections to the general use of cataphoresis. The value of Dr. Bogue's caution is increased by his high professional standing and well-known sound judgment, and his ideas on this subject have been formed only after much personal investigation and experiment.

Any one at all acquainted with Dr. Bogue's methods knows him to favor the use of all obtundents which are free from serious objections, his desire always being to give the patient as much relief as is consistent with safety and thoroughness. Now that he has declared against the indiscriminate use of cataphoresis I believe that general attention will be called to the question, and as a consequence he will have a large following.

The possession of such a powerful means of obtunding sensation has turned many a man of natural conservative tendencies into a radical.

It is quite true that cataphoresis has made possible the prompt relief of a certain proportion of the cases of severe and sometimes mysterious pain which come to us all, but I believe this particular benefit to our patients to be more than offset by the injury often done them through the use of cataphoresis, which seems for many the panacea for all dental distress. Many illustrations of this have come to my knowledge during the past two years; some so distressing as to cause, I am sure, the unfortunate operators to wish that cataphoresis had never been discovered.

Fillings have been made by different operators almost upon the pulp, the cataphoric current interfering with the diagnostic symptom, *pain,* which otherwise would have warned the operator of the somewhat abnormal position of the pulp in each case. Wedding rings, innocent emblems of a holy state, have in various instances served to conduct the electric current, causing deep and painful lesions underneath them. Pulps almost without number have been removed, or partially so, in the effort to relieve distress, the cause of which afterward proved to be a cavity in another tooth, a calcic abscess, tic douloureux, or other grippe sequences, all reflex.

To be sure, errors of judgment are not caused by the knowledge of a method, nor are they prevented by the lack of the same, but the possession of a powerful process for good or ill makes possible the extremes of both.

One of my principal objections to the use of cataphoresis in general dental practice is that it makes possible the almost painless removal of the dental pulp at one sitting from certain teeth. Anything which facilitates the removal of that organ is likely to cheapen its value in the minds of dentists and to make its destruction more general.

Dr. Bogue has well pictured the dangers accompanying the imperfect removal of the dental pulp, and, as it is impossible to entirely remove it from many teeth, its conservation in the majority of cases, even if its presence did not benefit the tooth, would be advisable. Practice based upon frequent pulp removal, which implies a lack of appreciation of the value of the pulp to a tooth after full development, means practice harsher in methods, more mechanical in nature, and devoid of the delicate technique common to the operator desirous of conserving the pulp and so necessary to the highest and most enduring results. Dangerous, in my opinion, are the teachings of all who advocate extensive pulp-removal, the results of the practice being an increase in the liability to pain and abscess and a great decrease in the masticating strength and elasticity of tooth-structure.

As I have some knowledge of the interesting case which Dr. Bogue has described for us at some length, I may be pardoned for briefly commenting upon it.

The case is most distressing to me in that I believe ordinary palliative treatment by conservative hands would have resulted in the young lady's relief from pain in a few hours. Instead of depending upon the operator who had faithfully and successfully served her from childhood, the patient, through the advice, I presume, of a member of her large family, placed herself in the hands of a gentleman whose treatment seems to have been extremely radical and more calculated, in my opinion, to be a cause of distress than to relieve it. Cataphoresis aided in the destruction and partial removal of several pulps as tooth after tooth was suspected, and when, in addition, the repeated efforts of surgeons had failed to relieve the patient's pain, it was the removal of the overlooked portion of one of the cataphorically treated pulps which gave comfort finally. One can but regret that the carefully kept records for twenty years had not been taken advantage of in this case.

I expect that Dr. Bogue's paper will be thoughtfully received, and I believe that we may all derive benefit from the caution so earnestly given.

Dr. Bogue. The object of this paper was to elicit a discussion of the question whether it is possible to accurately remove the living pulp from all molar teeth, premolars included.

There was a general expression of opinion by those present that there were many roots from which, owing to their tortuous shape or their extreme fineness, it would not be practicable to remove the whole of the living pulp by instruments.

INSTITUTE OF DENTAL PEDAGOGICS.

(Continued from page 352.)

Dr. A. D. Gritman, of Buffalo, N. Y., read a paper entitled "The Use of the Blackboard in Technic," which is printed in full at page 433 of the current number.

Discussion.

Dr. H. W. Arthur. What I have to say is what has come to me while listening to the essayist. The subject of the use of the blackboard, or in regard to the advantage of the blackboard, is one I indorse very fully, and in my limited experience I have found it exceedingly valuable. Some men have an idea that they must be artists in order to make use of the blackboard, and I think for that reason they do not probably use it as much as they should. I think we can use the blackboard to great advantage by preparing something before we go to the class. Where we have a double blackboard, we can thus anticipate the work by making the drawings beforehand, and then call the attention of the students to the point we want to draw out, and use the chalk in that way, rather than making the whole drawing before the class.

There is no question about it, no matter how clearly we express a thing in English, we do not convey the impression that we would by a drawing. We all know that. My own experience has been in going among a class after I thought I had presented the subject very clearly, and there could be no misunderstanding, I would find few who had a full comprehension of what I wanted to convey; but by the use of the board I find I have been able to convey accurately and clearly the impressions I wish to, so it would be understood.

What I have to say would be more in the line of the way I have used the blackboard. For instance, in taking up the study of form. And first the teacher ought to show that he can do what he asks them to do. So, if we are drawing, we ought to be able to show the students we can do what we ask them to do. If we want them to carve a tooth, we ought to be able to show them that we can do it. Some students may not be able to perfect and make any and all the details of the tooth, yet they can bring out the form with sufficient perfection so that we know that they know the form of the tooth. In carving the teeth, the first thing I have them do is to make exact measurements, taking Black's "Anatomy" as a guide. Then, taking a block, I have them, with these measurements, cut out the shape. We call it "blocking out the teeth." Then they mark the outline—just a general one—of the tooth with sharp instruments.

In regard to dissecting teeth, you want to tell them how you would begin to cut the tooth. If you tell them to take a half-round file and cut just below the cervical portion, probably they will take the edge of the file and cut across the pulp-chamber or canal; but if you tell them you want to approach at that point, and show them just where you want them to cut, they will approach it right.

Then, in the matter of teaching the proportions of cavities, it just occurs to me if you want to show where the undercut should be in the dentin, it can be of great advantage. And in all these ways the chalk can be made to serve a great deal better purpose than any drawings that we may have, because we can modify it, rub out, and add; whereas we don't want to mar or destroy a drawing. For instance, we take a typical tooth, a cuspid. If we want to show how the other teeth are combinations or modifications of this, we can show, for instance, that the lateral incisor simply by removing the cusp that way we have more or less the form of the central incisor, and by combining the two cuspids we can readily see how the combination of the two cusps will make a bicuspid. In that way we can convey with a blackboard a great deal more readily than by oral expression. That is the way I have been accustomed to use it. I am sorry I am not better able to present what I have to say. That is my apology for not making it more clear to you.

Dr. N. S. HOFF. There is a method of using the blackboard that I have heard of but never used myself. It is used in the old country by those who teach histology; but, instead of using the blackboard, they use ground glass, and place underneath it the outline or form, to which they make additions with crayon on the ground glass. It has occurred to me that if our teachers in orthodontia had some such method they could have behind the glass a set of teeth upon which could be put all sorts of appliances. It is very difficult to convey to students just how to adapt these appliances in the mouth for regulating purposes, and I wonder that some one has not adopted this method.

Dr. L. S. TENNEY. I have listened to the fundamental principles of teaching that have been so admirably presented by Dr. Webster, and we have had this very able paper in which the practical side has been presented to us. The longer I am engaged in teaching, the more thoroughly I am impressed with the idea that it is absolutely impossible to teach by didactic instruction only, and the more we can be assisted by models and illustrative work of this character the better success we shall have. It seems to me to be absolutely necessary that we should appeal as well to the sense of touch as of hearing. I have often wished that I was a crayon artist, and often thought that I would take lessons. We see here what a vast advantage it is to utilize this method of presenting a subject. I feel that it has been a very valuable session, and I want to compliment both the essayists on their papers.

Dr. W. H. WHITSLAR. I want to illustrate a point that the essayist suggested in his paper, that sometimes a very few strokes may illustrate a very important lesson.

(The speaker then showed by drawings the effect upon the expression of the face caused by the loss of the teeth, showing different expressions of the mouth following the loss of different teeth.)

Dr. BARRETT. An idea of form can only be conveyed by sight; hence the teacher who depends wholly on verbal or oral instruction cannot give to the students that which he should. Further, the object itself does not do it. First you have the parts, then you have the parts united. For instance, I place on the board these two lines; it conveys nothing especial, nothing that gives any idea of what it is going to be. I add another line, and you have at once a full idea of what I wish to present (illustrating on board). Hence in my own work, where the blackboard is of as little use as it could be in any branch of teaching, yet I use it a great deal. If I had skill in drawing I would be a much better teacher than I am, but with my crude ideas of drawing, with chalk in my hand, I can often present an idea very fully and bring out what I desire to present.

Dr. G. H. WILSON. I want to emphasize the idea that has been brought out by the last speaker, that it is not always necessary to have an elaborate idea of drawing in order to use the blackboard acceptably, because many times the crudest drawing will bring out an idea very nicely. For instance, if we wish to illustrate the regulation of the teeth, the student would not see the idea so clearly if we drew a perfect tooth; for with a bicuspid we have a triangular form representing the several surfaces coming together, and we show to the student that the force is always applied at right angles to the surface from which it is required, so that by drawing straight lines we make the triangle, and we can show how the force should be applied. We can do that better with the crudest drawing than with an ideal form of the tooth. Any of us can draw simple forms, and it is a wonderful assistance in teaching.

Dr. JAS. TRUMAN. I wish simply to indorse the idea of the blackboard. It is some thirty years or more, I think, since I abandoned the use of preparing drawings, sketches, etc., to give to a class, for the reason that I would not care to present a written paper or lecture. I would not desire to bring up every year these old drawings, which the class gets perfectly tired of looking at and to which they pay no attention. If you draw upon a blackboard all that you desire to illustrate, either before the lecture or during the lecture,—but I prefer doing it always before,—you then have something that attracts attention at once, even though it may not be very artistic. I am inclined to think that methods of didactic teaching without the use of the blackboard at all are almost practically worthless. We must, as has been stated, attract the student's eye as well as his hearing, and I think it is more important to attract the eye. Now, of course, none of us can be considered artists in drawing, but I think every man with a little practice, if he is a teacher anxious and ambitious to be something, can readily acquire sufficient tact and knack to draw on the blackboard. As far as I am concerned, some lessons I had in drawing when I was quite young have served me a good purpose. Although it never made me an artist, it aided me materially in my work. I am sure every teacher ought to endeavor to do something in that line. In fact, I think drawing on the blackboard with colored chalks is more satisfactory than lantern exhibits. I have seen both and used both, but I prefer the use of the blackboard under certain conditions.

Dr. C. S. CASE. This is a subject which strikes me as one of the most important things in teaching. The first thought that occurs to me is that a man should know and see in his own mind what he wants to produce. If it is a tooth, he should know the anatomy of the tooth thoroughly, and should be able to see that tooth in his own mind; it should stand out as distinctly before him as if he were looking at the tooth itself. Then he can turn it to any attitude and put the picture of it on the board, and that is all there is of it. When he can do that he is able to teach, and if he cannot do that, if he has got to draw from some stereotyped picture that he has seen, it strikes me that he is not making the best use of the blackboard or the blackboard method. Now, that has reference not only to the teeth, but to everything else. Some men are more fortunate along this line than others. I have been very fortunate in that way, and have been able to reproduce almost everything I desired, and I have found it to be one of the greatest aids in teaching. If we would talk less and show more, we would make a greater impression on our students.

Dr. S. H. GUILFORD. It seems to me that every teacher ought to avail himself of the various methods of teaching, whatever they may be. That is to say, we don't want to teach in a stereotyped way, and whenever illustration will aid us in any way, use it. It can be done in various ways, either by diagrams prepared or very elaborate and correct illustrations, or we can use the blackboard. We cannot convey ideas by words only; we must utilize the eye as well. In my own work I have some very elaborate drawings, anatomically correct and beautifully done, and I hang them on the wall and lecture from them. At other times I go before the class and make the drawings on the board, and I know they are very much more effective. I never knew a student to copy a ready-made drawing into a note-book, but frequently have seen drawings in the note-books.

There is another point, suggested by what Dr. Barrett said, as to making a couple of strokes to bring out what you otherwise could not do. In making a drawing, if you can associate with that some other geometrical figure or form it will be better.

What Dr. Truman said is very true, about students becoming familiar with the same figures brought before them from time to time, and they tire of them and pay no attention to them whatever. But we should not do too much of it. As soon as the teacher's back is turned to the class, there is bedlam in the other end of the room. With the chalk in hand, never lose attention. Do a little at a time, and watch the class all the time.

Dr. E. C. KIRK. I think there is no department of our work which is more important and which will excite more interest than the subject of manual training as a means of mental qualification. We have not been pioneers in this matter. The manual training idea in general education is, as you all know, a topic or line of pedagogics which has been pretty carefully worked up. Some years ago it was my good fortune in an investigation of this subject to come in contact with a gentleman who was an enthusiast in this training. He was not only an enthusiast in general terms, but a man who exemplified in his own life the results of a proper system of manual training. I therefore take great pleasure in introducing to this audience Professor J. Liberty Tadd, of Philadelphia, who has, I think, done more than any other one man to popularize this system of education.

Professor J. LIBERTY TADD. Mr. Chairman, it gives me great pleasure to speak to you on the subject of manual training in education, because I consider it of more importance than any other subject that can engage our attention, since it teaches the physical being, the mental being, and the spiritual being. Is there any work in the world comparable to the unfolding and expanding of a human mind? Teachers are builders of the city not made by hands, every stone of which is a living human soul intrusted to their care to shape or mar.

I am to speak to you on the subject of manual training; by that I do not mean just the hand, but mental training. We think with the brain, but we act with the hand. We must make the one the good, obedient servant of the other. Some one has said the hand is a projected brain, by which we direct the thought and achieve the heart purposes of man. The hand is the projected brain through which are directed the thought achievements of the heart purposes of man. I have to make a plea to-night for the development of the hand and the eye, two of the capacities which are very greatly neglected in all the schools. I am to show you a method of work that is quite radically different from that carried on in other schools, except the one established by and sprung from the Industrial Art School. Aristotle said the hand is the instrument of the mind. It is the instrument of instruments. It is the key whereby are unlocked the potentialities of the being, and if we are to do anything for the young surely we are to give them a chance to grow into power instead of out of it. One of the saddest things in my experience is the fact that parents bring their children to me all the time unable to do anything. The hand is allowed to grow up and become adult before it is allowed to do anything. The same with the sense of sight. Some of the other capacities are cultivated up to a certain amount of training and discipline, but the sense of sight is allowed to go on as best it may. Nay, in some of the schools we actually injure sight. We shorten it, and a great deal of the joy and pleasure and usefulness is thus left out of life by neglecting the sense of sight or vision. It is the united action of the eye and mind that gives accurate observation and keen perception, sound reason and energetic action.

In a paper read by Dr. Kirk a few years ago this statement was made, which is one of the classics in manual training. He says, "The development of the mind is a natural physiological process exhibiting two phases, one of which is the acquisition of ideas through the perceptive faculties, and the other the practical arrangement of and reasoning from these acquired ideas." I might add another, which is the amount of executive volition that is generated, volition self-generated, and that is the thing we endeavor to do. Nothing is of more importance to the young than the possession of a physical being capable of making refined, delicate, accurate movements, which minister in so many ways to the welfare of the organism. Nothing is of more importance than the possession of a mental fabric built up by accurate observation, filled with clear, lucid, perceptive ideas, the result of the skillful, delicate movements. Nothing is of more importance than the possession of a spirit capable of giving an energetic impulse to the body and mind in the direction of the right and necessary. This threefold object of the work is what I wish to explain to you. It is not the subject of manual training alone. It is something more; much more. If we are to do anything for the young in educating them, we are to give them a chance to get the joy and beauty that is blended in nature, as deep and high and broad as space. To give them a chance to enter into the heart and voice of the Almighty, speaking to them from common things of nature, things of which we see so much and know so little, before they are thrust into the grooves of business, which too often become mere ruts.

I have spoken to you of the work we are carrying on in the public Industrial Art School, an institution where I have been experimenting for over twenty years. I fortunately have been allowed to do what I pleased, and nearly the whole of the time I have been performing experiments, and I have come now to some settled facts, which I want to show you. At the beginning we tried many kinds of manual training, wood work, clay work, metal work, and a number of minor points. We have settled down to four fundamental things that I shall show to you. The entire object has been to get something that will give skill to the hand, fundamental skill; to give accurate observation, and, at the same time, through the hand to build up that fabric of ideas. The object is not only skill of the hands, but through the hand we develop the brain centers, and we actually fabricate ideas. I am accustomed to say that the hand is rooted in the mind. The work differs entirely from the work carried on in any of the schools where they have mechanical training, practicing carpenter work and various kinds of like studies. We study for the practical development of the entire organism, the hand, the eye, the mind, performing certain exercises for getting certain ends. The school offers exercises in various mediums; for some purposes soft clay and tough wood. For the purpose of gaining skill in shaping various things, we offer plants, flowers, shells, fruits, birds, etc., during the nascent period when children are most fascinated with nature forms. If we don't take them at that period they never become interested, and do not get the mental images that are so desirable. If we take them at the period when they are fascinated with natural forms, we get a different mental fabric. I will prove that the whole is a work of thought expression, just as speech is a mode of thought expression, as writing is a mode of thought expression, and as is music. If we study these methods we get ideas that will help us in our work. For instance, we know children learn to speak by making simple sounds, and then by the almighty force of habit; by repetition they made those sounds automatically, and from these sounds they made words, and the words form sentences. We do not say that we have fluency in speech until we can give the entire attention to the idea which we wish to convey. And so in writing, you may remember how difficult it was to first make the rotary movements, the shaping of the lines. By practice, by repetition, by the almighty force of habit we gradually become able to make these forms, and then group them, forming words; and from these we make sentences. And we do not say we have the facility in writing ideas until we can give the entire attention to the idea we wish to convey, instead of to the shaping of the letters. So it is with music. Some of us can remember how difficult it was to make the first motor movements on the piano or violin, but by practice we become able to do it first with one hand, then with the other, and then both together. All the study in the world, all the genius in the world, will not enable me to perform the simplest piece unless by repetition I build into my mind these motor movements, so that I do not have to give thought to the position of my fingers. And the more frequent discharge of energy there is back and forth from the nerve-ends to that center of the brain tract directing that movement, the better I can perform it. So it is with all our work.

There are different kinds of expression in material, just as different kinds of expression in drawing. You know there are many kinds of architecture, machinery, object drawing, and so on. There are different modes of expression in wood, clay, iron, stone, etc., but all hand workers agree that there are certain fundamental principles. What are they? First, facility of the hand. No one disputes the fact that this is desirable in manual training. We make that automatic. Now I will point out where we are different from all other schools, from the fact that we make many of these things automatically with perfect facility from the start. Another thing is the power to make things stand erect; to feel horizontal lines or vertical lines. Then another thing is to be able to feel balances; an automatic power to feel one side equal to the other; to be able to feel fitness; to be able to grasp magnitudes. The moment we can feel proportion and grasp it through the hand instantly, automatically, we have power. That is the fundamental principle of the work I shall explain. Let me illustrate. I shall use the simplest marks we have in the kindergarten, and I shall show you a class room with the children at this work.

I am going to make a circle (stepping to the blackboard and illustrating). It is the first time I have done it, and you notice my hand shakes. I am a little nervous, you see, but by practice, by repetition, I get so I can swing my hand without any trembling. Of course I am speaking of children five or six years old. By practice, by swinging the hand continually, we gradually get power to make that movement with facility. The same with the left hand (illustrating). At first it will be difficult, but by practice we get so that we can swing the hand freely; and then with both hands (illustrating); then reversing; then to the right; then to the left, each one of the movements being a new physical co-ordination. We never give more than five minutes at a time, but we make every possible physical co-ordination that is possible on a flat surface.

This is another one (all these remarks are accompanied with illustrations), a little more difficult you see, making hand go in different directions. We have large classes in the feeble-minded institution at Media. We found they could do this work of co-ordination, and beautiful work is the result. In a very few seconds, never more than three or four seconds, almost any co-ordination can be made. Let me show you straight lines. I shall scribble because I want to show you so much. Each form is made with both hands. For instance, I am making this; by repetition I become able to swing my hands freely, no trembling at all. It is done automatically; that is what we aim for. We don't seek for accuracy; we seek facility, and then accuracy. In doing this I am gradually becoming able to feel form and movement, until I get perfect dexterity. I shall not make each form, because I want to show you so much. Each one we make in all directions, and get every possible movement on a flat surface; and the same thing in soft clay, and the same in tough wood. We have many of these forms that we make in various directions. Now, very quick, I wish to show you some of these forms, based on the thought that they are made automatically. I am purposely drawing these very rapidly to show that they are made automatically. Of course, if I took a little more time I could make them better. Now you see the range. We take any design and make it automatically first, and then see the range of possibilities. Every one gets the power to make the same thing in soft clay, and then in tough wood; and you can see at once the co-ordination; not only on the flat surface, but in soft clay and tough wood. If I take up this chisel I am required to be able to cut right and left; the same with this gauge, I must be able to push or pull on both sides; the same with the mallet. You never heard of an engraver using one hand. All sculptors work with both hands. We must feel the wood through the chisel, if it is two feet long or three feet, just as if I was touching it with my finger; actually drawing in wood as we draw on the blackboard, just as we draw in clay and wood. Wood has a certain amount of texture which resists in some places, as the grain goes across or straight. We have to work four ways in going around a circle in carving. I am speaking now of carving, because I consider it of such great value to be able to cut out form by thinking form; to be able to project the thought and then cut out the form in the wood. In this way I can measure force. I can put here a pressure of fifty pounds by pushing with this and holding back with the other. These movements are especially appropriate for manual skill in a certain amount of physical co-ordination. With these exercises we have this automatic power to be able to grasp form in any medium, in wood, clay, ivory, or metal; to be able to feel form. There is always one point of the circle where the hand will find it a little more difficult. In making that I have made a double curve all around the circle edge. I have the power to go off and make the greatest variety of forms. You can see at once it is automatic. This time it is more complex. I begrudge the time of these diagrams because I want to show some of the children at work, but I can go up to the most elaborate forms that are used in art, each form being drawn free-hand and made automatically. With the children in this work we have three mediums, the blackboard or paper, then in soft clay, and then in tough wood. The children are compelled to remember and recollect the images. We don't care how crude they are, but we get wonderful results.

I shall show one or two of the boys' work before I show anything else. These are boys from the Catholic High School. I have charge of the public Industrial Art School, where we take care of ten hundred and sixty children. Each week they receive two hours. My endeavor has been to get the greatest amount of manual training possible for the large number. (Three boys about sixteen years of age were sent to the blackboard and told to draw what they wished.) Notice that the movements are automatic; the boys can do the same thing in clay or wood. I want them to hasten, because my time is limited. Now, remember, these boys can think form of any kind, and they can draw all day long and the pattern will be different. Of course they will draw other forms, geometric, or constructive, or natural forms. These forms show a certain amount of balance and proportion, and you see the endless variety that can be made. Most people in drawing must keep a piece of rubber in one hand and rub out half they do. Our children think form; not only form on a flat surface, but also in tough wood or soft clay. I want you to get the idea that we have automatic power in this work; that they don't have to give attention to the movement of the hands. The forms they are making are simply projected ideas.

Some people might say these forms are not correct. The Greeks were the greatest draughtsmen of whom we have any knowledge, and they never made a correct form. They never made two sides of one pattern absolutely alike. There was always enough difference to show that it was hand-made. These boys have worked four or five years, and are through the high school now. We are working a little too quickly, because I want to show you so much and have so little time.

Now I shall show you some of the drill forms. Understand, we give these forms to small children. It is better than a great deal of the kindergarten work carried on, because it makes use of the free-hand, arm, and spine movement. There is a great deal of wrong in the kindergarten system, because they use the fine centers too soon. They do paper cutting and stick pins in holes, etc. I believe in the spirit, but not in the act of kindergarten teaching. We have lots of children that make perfect circles, swinging the hands one way, and then the other. How do we get nature forms? How do we get natural forms? Let me illustrate. I have a large class of children, and I say to them,—we take one or two hundred at a time,—and I say let us draw a horse or a man. Some say they can't make a straight line. If I ask a lot of children to draw a man, they make something that gives the idea of a figure. If I ask them to make an animal, they make perhaps a body and tail and four legs. We can't tell what kind of an animal it is, but it gives an idea. If you have ever made a diagram of anything, no matter how crude, you can hardly forget it. The point I want to make is that in making these things we use the muscular sense, and we lock the idea in the mind permanently. Now I am going to make a very rough diagram. I am thinking a bird with a long neck; here I am thinking a bird with a short neck, and here I am simply putting down certain mind impressions. The same if I think any other form. No one can draw and delineate a simple form without making a more vivid impression. We help the mental faculties; we do fabricate ideas.

There is nothing of more importance in education than a power to get accurate observation and keen perception, sound reason and energetic action. It comes through these three modes of work, and I claim there is nothing will energize the organism more than doing this work. While getting power to discharge energy through the nerve-ends by these movements, we energize the centers of the brain. It is during the period of youth that we must do this if we wish to get good results; this superabundant energy that children are so filled with that must be directed in these channels. It is thrown away now and wasted in many cases. Too often in the schools we consider printed, written, and spoken words instead of real things. I would make a plea for more time to be taken from book studies and given to the realities. I have a shell in my pocket, a stone, a flower; anything would do, form, color, etc. It is bristling with ideas; it is teeming with facts. Is it unreasonable to expect that the pupils that are getting an education should become able to focalize these facts? I claim we should get them so they can instantly respond to any natural form. I ought to be able to give fifty under each head, and then all the abstract facts. That is not unreasonable, and in doing this work we do get mental fabric. That is quite different from that where they assimilate only printed, written, and spoken words. Every natural object teems with something that is wonderful in form, color, texture, and the study of them creates expansion of physical knowledge, mental knowledge, and spiritual knowledge. If God speaks at all,—and who doubts that he does?—he speaks through his works. Morrison says we are to bend to the persuasion that is flowing to us from every natural thing. Shakespeare says there are

> "Books in running brooks, sermons in stones,
> And good in everything."

Now I shall show the boys again drawing some natural forms, and then I want to show the work on the screen. These boys will not only make one form, but will make it in any position. You know a great deal of time is lost in school by memorizing. We use this work in all the studies, anatomy, botany, geology, zoology, and we lock the facts into the mind through the sense of touch. In one case energy is consumed, in the other it is conserved. Of course, you can see these boys are feeling a certain amount of form. Some one has said that genius is the power of co-relating innumerable memories. These diagrams illustrate how we get the technical names. By means of diagrams we lock the ideas in the mind. I make a diagram of a fish and put the technical names to it, and it is retained in the memory; for we use the sense of touch, and then we make an impression that is permanent and abiding.

(Lantern slides were then exhibited, showing the interior of different school rooms and the work done by the students in the different institutions.)

At the close of the address it was moved that a vote of thanks be extended to the lecturer for his most interesting and instructive lecture.

Dr. E. C. KIRK. I feel there is no time at our disposal to discuss this matter, but I wish to say a word, to raise this thought in the minds of those present, if it has not already occurred, and that is the significance of this course of preliminary training as one suitable for the students preparing to enter upon dental studies. It seems to me if our students could receive a course in manual training, we would have a much more satisfactory foundation upon which to build the superstructure of dental education.

A MEMBER. Is it feasible for adults to attempt work of this kind? Is it not designed to begin with children rather than at adult life? Do adults ever attain any great degree of proficiency?

Professor TADD. Of course physical co-ordinations and mental co-ordinations can be made better in youth, but I find people of sixty years of age can do this. We have plenty of them. We have large classes of public school teachers. Of course, it is more difficult to make a man learn writing at forty years of age, but he can always become able to write; so I claim I can make a man of forty or sixty do this work. This does not require genius; we make capacity by the repetition of certain deeds. We have feeble-minded people who do this work. Sometimes pupils who have the least power in the beginning do the best; those who start very brilliantly sometimes do not equal the others.

I especially feel it is desirable for dentists, doctors, and surgeons, because it teaches ambidexterity. I have taken graduates from some of the greatest institutions of this country, Stevens Institute of Technology, the Boston School of Technology, and others. I have found that they have a certain amount of power in certain directions, but they do not have manual skill as I mean it. They don't have this automatic power to feel form, to recollect and revive mental images. That is what we claim is most valuable, to memorize and feel form. I have suffered at the hands of dentists; not in this country, but in Canada. I had a man chisel in a cavity, he called it; it was really a cave or cavern in one of my teeth. He would push and could not inhibit. You know what that means. He could not inhibit his touch. He would jab the drill into my gum very frequently. I felt that that man did not have manual training. He needed a certain amount of power to retard his touch, to feel form. By working in these three forms we get that power in a remarkable degree.

Dr. W. C. Barrett. It is necessary for the dentist to have his hand educated as well as his head, but life is too short for the higher education. We want fifteen years for educating the brain and fifteen years for educating the hand, and where would you draw the line between the two, as to which shall not overlap the other; what is the most appropriate point at which to stop the education of the brain and the education of the hand? That is the practical point that comes home to us.

(To be continued.)

DENTAL SOCIETY ANNOUNCEMENTS.

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

The next meeting of the American Medical Association will be held at Atlantic City, N. J., June 5 to 8, 1900. The Section on Stomatology presents the following program.

Symposium on Dental Education:

1. Relations of Dental and Oral Surgery to General Medicine; Professional Status of Properly Educated Practitioners of Dental and Oral Surgery. Dr. N. S. Davis, Sr.

2. Preliminary Qualifications. Dr. J. Taft.

3. Course of Study. Dr. W. A. Evans.

4. Methods of Teaching (Didactic or Recitational). Dr. A. H. Peck.

5. Shall the Dental Student be educated Independently of General Medicine? Dr. G. V. I. Brown.

6. Is Medical Education a Necessary Qualification for Dental Practice? Drs. Alice Steeves and R. R. Andrews.

7. The Practical Value of a Medical Education in Dental Practice. Dr. W. B. Hill.

8. Technical Training *versus* Theoretic. Dr. John S. Marshall.

9. Should the Medical Undergraduate be instructed in the Principles of Dentistry? Dr. M. L. Rhein.

10. Post-Graduate Study in Dentistry and Degrees Therefor. Dr. W. E. Walker.

11. Handwriting upon the Wall; What Does it Portray? Dr. A. E. Baldwin.

12. Limitations. Dr. Eugene S. Talbot.

Symposium on Interstitial Gingivitis or So-called Pyorrhea Alveolaris:

1. Etiology. Dr. G. Lenox Curtis.
2. Neurotic Affections. Dr. J. G. Kiernan.
3. Indigestion Auto Intoxication. Dr. Eugene S. Talbot.
4. Chemical Factors in Etiology. Dr. W. L. Baum.
5. Constitutional Treatment. Dr. J. H. Salisbury.
6. Local Treatment. Dr. M. H. Fletcher.

So-called Glands in the Peridental Membrane. Dr. M. H. Fletcher.

The Evolution of Decay Continued. Dr. Arch. C. Hart.

Co-operation of the Public Schools in Teaching. Good Teeth, Good Health. Whatever we wish to introduce into the life of a nation must be introduced into its schools. Dr. Richard Grady.

Subject to be announced. Dr. V. A. Latham.

The Section on Stomatology will meet at Hotel Senate. The officers of the Section invite all to be present, and to take part in the discussions.

Those who wish to join the association must obtain credentials from their state or local dental societies, and pay $5 to the secretary of the association. This will entitle them to the *Journal* for one year.

Accommodations can be had by writing F. B. Cook & Son, Hotel Senate.

EUGENE S. TALBOT,
Secretary, Section on Stomatology.

NORTHERN OHIO DENTAL ASSOCIATION.

THE forty-first annual meeting of the Northern Ohio Dental Association will be held at Cleveland (Colonial Hotel), June 5, 6, and 7, 1900, beginning at 10 o'clock A.M. sharp, Tuesday, June 5.

The new Colonial Hotel is especially fine in all its appointments. The proprietors have made the following rates for this meeting: One in a room, without bath, $3.00 per day; two in a room, without bath, $2.50 per day. Fifty cents a day extra for room with bath. Papers will be read as follows:

"Diseases of the Peridental Membrane," Dr. Florence M. Taylor, Cleveland; "Two Prosthetic Cases in Practice," Dr. W. J. Green, Ashtabula; "Quackery, Real and Imaginary," Dr. Grant Mitchell, Pittsburg, Pa.; "The Causes of Dental Abnormalities," Frederick L. Miles, Cleveland; "Treatment of Children's Teeth," Dr. G. H. Ormeroid, Warren; "Sterilization in Dental Practice," Dr. J. Bert George, East Liverpool; "Professional Honesty," Dr. W. Buzzell, Port Clinton; "Chemistry in Relation to Dental Science," Dr. E. B. Lodge, Cleveland; "Advantages in the Use of Crystal Mat Gold," Dr. N. H. Bishop, Andover; "The Repair of Failing Gold Fillings by the Use of Amalgam," Dr. C. B. Mower, Wooster; "Duties We Owe to Our Patients," Dr. C. W. Purcell, Lorain; "Reflex Lesions of the Oral Cavity Associated with Pregnancy," Dr. F. A. McAuley, Cleveland; "Some Thoughts on Practical Dentistry," Dr. T. S. Seeley, Norwalk; "The Significance of Facial Expression," Dr. Hugh B. Mitchell, Canton; "Individuality *vs.* Personal Requisition," Dr. M. C. Ramaley, Cleveland; "What Filling-Materials

Shall be Used to Best Serve Case in Hand," Dr. Stephen D. Potterf, Defiance; "An Experience in Replantation," Dr. Harry L. King, Wellington; "An Interesting Case in Practice," Dr. G. A. Kennedy, Kent; "Anesthetics in Dentistry," Dr. A. E. Mann, Findlay; "The Decay of the Teeth," Dr. L. L. Bosworth, Cleveland; "Some Reasons why Teeth should not be Extracted in Youth," Dr. G. B. Williamson, Akron.

Clinics will be held as follows:

"Surgical," Dr. W. G. Ebersole, Cleveland; "Amalgam Filling, Using Flexible Matrix," Dr. C. D. Peck, Sandusky; "Rapid Progress of Cutting a Cavity in an Artificial Tooth," Dr. F. D. Davis, Minerva; "Tin Foil Filling—Hand Mallet," "Tin-Gold Filling—Hand Mallet," Dr. H. L. Ambler, Cleveland; "Wire Clamp," Dr. H. F. Harvey, Cleveland; "Orthodontia—Detailed Construction of a Stationary Anchorage Appliance," Dr. Varney E. Barnes, Cleveland; "Surgical Orthodontia," Dr. S. M. Weaver, Cleveland; "The Removal of Gum Tissue from Unerupted Third Molars, by Original Instruments," Dr. J. R. Bell, Cleveland; "Setting a Davis Crown," Dr. J. R. Owens, Cleveland; "Phagedenic Pericementitis," Dr. I. W. Brown, Cleveland; Orthodontia—"A New Method of Making Regulating Appliances," Dr. W. A. Price, Cleveland; "A Filling Made with Non-Cohesive Gold," Dr. W. A. Siddall, Cleveland; "Compound Cavity Filled with Moss-Fibre Gold," Dr. D. H. Zeigler, Cleveland; "Immediate Painless Removal of Pulps," Dr. G. W. Woodbury, Cleveland; "Combination of Amalgam and Cement as a Filling-Material," Dr. H. C. Kenyon, Cleveland; "New Method of Shaping Plates to Dies," Dr. E. L. Patchin, Cleveland.

NATIONAL DENTAL ASSOCIATION, SECTION III.

At the last meeting of the National Dental Association it was decided by Section III to make the work of this section a feature of the meeting. To this end it has been arranged to hold the meetings of this section at such times as will not interfere with the general sessions. All papers upon the subjects embraced in this section will be read in these meetings, excepting two or three which from their general interest have been selected by the committee for presentation to the general body.

A suitable room will be provided and the program for each meeting duly announced. Some good papers are promised.

It was further decided to hold clinics. These will comprise operations upon patients, and demonstrations upon casts, models, etc. It is desired that every one who has anything new, original, and helpful will bring or send his appliances, models, and illustrations. While new appliances may be shown subject to the provisions of the constitution, nothing can be offered for sale. Suitable provision will be made for the carrying out of these clinics.

Let every one interested in this section who has anything to offer communicate at once with

Thos. E. Weeks, *Chairman,*
Dayton Building, Minneapolis, Minn.
Jno. I. Hart, *Secretary,*
118 West Fifty-fifth street, New York.
or Thos. P. Hinman,
Chairman Clinic Committee,
Atlanta, Ga.

NATIONAL DENTAL ASSOCIATION, SECTION VI.

THE Section on Etiology and Physiology will be pleased to receive contributions for the next annual meeting. Send at once to L. E. Custer, Secretary, Dayton, Ohio, or J. D. Patterson, Chairman, Kansas City, Mo.

TENNESSEE DENTAL ASSOCIATION.

THE thirty-third annual meeting of the Tennessee Dental Association will be held in Memphis, Tenn., May 8-11, 1900. The Executive Committee promise a program of unusual interest, with some *special* feature for each session. Members are urged to be present, and a cordial invitation is extended to all members of dental societies from adjoining states, and all members of the profession in good standing.

A one-fare rate has been secured within a radius of five hundred miles, good for six days, on account of the celebration in honor of Admiral and Mrs. Dewey, who will spend Monday and Tuesday, May 7 and 8, in Memphis. The city will be in holiday attire, and it will be an occasion of recreation and enjoyment as well as professional benefit to all in attendance.

A. R. MELENDY, *President.*
A. SIDNEY PAGE, *Secretary.*

The Tennessee State Board of Dental Examiners will hold its meeting at the same time and place.

PENNSYLVANIA STATE DENTAL SOCIETY.

THE National Dental Association having changed the date of its meeting for this year to July 10, the Pennsylvania State Dental Society will meet on July 5, 6, and 7, 1900, at Reading, Pa., by vote of the council.

ROBERT HUEY, *President.*

MISSOURI STATE DENTAL ASSOCIATION.

THE thirty-sixth annual meeting of the Missouri State Dental Association will be held July 10-13, 1900, at Louisiana, Mo. A cordial invitation is extended to all reputable dentists to attend.

B. L. THORPE, *Cor. Secretary,*
Laclede and Vandeventer aves., St. Louis.

CALIFORNIA STATE DENTAL ASSOCIATION.

THE next annual meeting of the California State Dental Association will be held in San Francisco, June 19, 1900, continuing four days.

W. Z. KING, *Secretary.*

WASHINGTON STATE DENTAL SOCIETY.

THE thirteenth annual meeting of the Washington State Dental Society will be held at Spokane, May 17-19, 1900, inclusive. An excursion rate of one and one-fifth fare has been secured.

M. D. THURSTON, *President,* Spokane.
D. I. BURKHART, *Secretary,* Seattle.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The National Association of Dental Faculties will meet at Old Point Comfort, Va., on the afternoon of July 13, 1900.

J. H. Kennerly, *Secretary.*

DENTAL EXAMINATIONS IN CONNECTICUT.

The Dental Commissioners of Connecticut will meet at the capitol in Hartford, Monday and Tuesday, May 14 and 15, 1900, for the examination of candidates for license and attend to any business proper to come before them.

Practical examination in operative and prosthetic dentistry at 10 o'clock, Monday, May 14. *(Date given in a previous notice was an error.)*

The written theoretic examination, Monday evening, May 14, and Tuesday, May 15.

Candidates holding temporary permits, and coming under the rules in force prior to January 1, 1900, must appear Monday, May 14, between the hours of 10 A.M. and 2 P.M.

All persons desiring to practice dentistry in this state must apply to the recorder for *revised rules* and for the proper blanks. Blanks must be carefully filled in and sworn to and with the fee, twenty-five dollars, filed with the recorder at least one week before the day of examination.

Geo. L. Parmele, M.D., D.M.D.,
Dental Commissioner and Recorder.

TEXAS BOARD OF DENTAL EXAMINERS.

The Texas State Board of Dental Examiners will meet at Dallas on May 14, 1900. All applicants for examination must come prepared to perform some practical operation.

Thos. P. Williams, *President.*
C. C. Weaver, *Secretary.*

VIRGINIA STATE BOARD OF DENTAL EXAMINERS.

The annual meeting of the Virginia State Board of Dental Examiners will be held at the capitol in Richmond, Va., beginning Tuesday, June 12, 1900. The examination will be theoretical and practical.

Applicants are expected to bring instruments, rubber dam, filling material, etc., necessary for making fillings or doing such other work as may be required. Chairs only will be supplied by the board.

Those desiring to take the examination are requested to notify the secretary ten days before the examination.

H. W. Campbell, *Sec'y.*,
Suffolk, Va.

CLASS OF '98, C. C. D. S.

The undersigned proposes to compile a directory of the class of '98, Chicago College of Dental Surgery. All members of the class will please send their address to

Frank Freymann, D.D.S.,
Dyersville, Ia.

NATIONAL DENTAL ASSOCIATION.

The date of meeting of this organization has been changed from June 26 to July 10, 1900, and the association will convene at Old Point Comfort, Va. This is a very pleasant place in which to meet, and everything bids fair for a successful and profitable gathering. Application has been made for reduced fare on all the railroads, and the rates will be published in the next issue of this journal. We would especially urge upon the state societies that they elect their full quota of delegates, and choose who will attend the national meeting. All those having papers which they wish to bring before the association should communicate with the proper Sections.

J. N. Crouse, *Chairman Executive Committee.*

MASSACHUSETTS DENTAL SOCIETY.

The thirty-sixth annual meeting of the Massachusetts Dental Society will be held in the American House, Hanover street, Boston, on Wednesday and Thursday, June 6 and 7, 1900. The meeting, clinics, and exhibits will all be held under one roof. An especial clinic is to be given on porcelain work by a prominent Philadelphia dentist. Good talent is also promised for both papers and other clinics. The exhibits will also be extensive. The hotel will give special rates and good accommodations. It is hoped that a large number will be in attendance, and a cordial invitation is extended to all reputable dentists to be present.

Edgar O. Kinsman, *Secretary,*
Cambridge, Mass.

SOUTH DAKOTA DENTAL ASSOCIATION.

The South Dakota Dental Association will meet in Lead, June 6, 7, and 8, 1900. A rate of one fare plus two dollars has been secured from all South Dakota points.

C. L. Blount, *Secretary.*

The State Board of Dental Examiners will meet at Vermillion on May 16, and at Lead on June 6, 1900.

G. W. Collins, D.D.S., *Sec'y.*

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

The South Carolina State Dental Association will hold its thirtieth annual meeting Tuesday, July 3, 1900, at Harris Lithia Springs, S. C.

David Aiken, *Secretary*

COLORADO STATE DENTAL ASSOCIATION.

The Colorado State Dental Association meets at Boulder, Col., June 12, 13, and 14, 1900.

L. S. Gilbert, *Secretary.*

EDITORIAL.

A STEP TOWARD UNIFICATION.

A MEETING of the New England Association of Dental Examiners was held in Boston April 19, for the purpose of bringing about a better mutual understanding as to methods of work in connection with state board examinations, and to promote uniformity in standards, with the object of ultimately arranging for an interchange of license certificates among the states represented. A full report of the discussion would be of general interest, as showing the practical difficulties that are encountered in the effort to bring about a general interchange of licenses. We are not at liberty to give publicity to the full proceedings of the meeting in question, but it was clearly brought out that the main obstacle in the way of securing the desired end is the imperfect and in most cases widely different character of our state laws. As we have several times pointed out, dental legislation is the result of an evolutional process; the restrictions which at one period are satisfactory become wholly inadequate under later and more complex social conditions, besides which much dental legislation is enacted under a mistaken impression as to what it can and what it cannot accomplish. Dental laws are for the protection of the public against incompetency; no other doctrine as to their object will stand the test of judicial investigation. It is true that dentists as a profession are benefited by the operation of laws which require a high standard of professional competency, but such benefit is the incidental result, not the primary object.

Dental laws will not prevent quackery, or advertising, or professional dishonesty. No law can make a man honest, though it may deter him from stealing. If the dental law should operate in any degree to reduce quackery, advertising, and the practices regarded as unethical, it will do so by its power to compel a higher educational attainment and better professional standards in the community, nor by directly penalizing the class in question. In short, no law can compel a man to regard dentistry as a profession if he prefers to regard it as a business and apply recognized business methods to its conduct.

We call attention to these points at this time because it appears to be the experience of dental boards and those familiar with their work that a great many members of the dental profession mistakenly look to legislation, and appeal to the executives of the dental law to relieve them of the competition of the class of dentists referred to. It is not in their power to do so, for the reason given.

The demand for unification of legislation is a general one, and it is of interest to inquire as to its animating motive. The expression is frequently made that a man who has been licensed in one state should therefore be permitted to practice in any other state without undergoing a re-examination. Are we so deeply interested in the material welfare of a distinctly minor class of dental nomads that our whole legislative system is to be reorganized, and the energy of the whole dental profession expended in the effort to benefit a class which bears but a small ratio to the whole number? Again, when it is considered that of those who do move from state to state a large number are necessarily men who are really not deserving, and are not infrequently the sort which it is the object of dental legislation to exclude, it becomes a serious question whether the interchange of licenses is, after all, an important consideration, or at least of sufficient magnitude to constitute the real motive back of the general demand for unification of state dental laws.

We think the demand has altogether another basis. Unification is a prerequisite to interchange of licenses. Unification is of necessity based upon equality or equivalency of standard. There are but two directions in which unification of standards can be attained, either by leveling downward to include the lowest, or by leveling upward to include the highest. The first is untenable, and the work of unification of standards must therefore be accomplished by a gradual elevation of state standards until a number of states have a common requirement which will make the interchange of licenses among them possible.

The Dental Examiners of the New England States accomplished this result at their meeting on April 19 by the passage of the following resolution:

"The standard of qualification for practitioners of dentistry from and after June, 1900, shall be as follows:

"The candidate to be twenty-one years of age, and to pass a theoretical examination in the following subjects: anatomy, physiology, histology, bacteriology, chemistry, pathology, materia medica, therapeutics, operative and prosthetic dentistry, crown- and bridge-work, metallurgy, orthodontia, anesthesia, and surgery, together with a practical demonstration of ability in operative dentistry, and to make an average of seventy per centum on an examination conducted by the Board of Dental Examiners in the subjects named.

"To provide a judicious and safe method by which a dentist moving from one state may practice in another, it is recommended by the New England Association of Dental Examiners that each state herein represented shall adopt the foregoing standard, and that its Board of Examiners may so far modify its examination in its discretion, and to such extent as it shall deem safe for public protection, upon the presentation of a license issued by a state board, with satisfactory evidence from that board that such license was obtained in good faith upon examination based upon the foregoing specified standard, and actually used for the purpose of practicing dentistry in that state in which it was issued, for at least one year from the date it was granted, and that the licentiate is in good professional standing and repute in the locality in which he last practiced.

"D. F. Keefe,
"John F. Dowsley,
"L. D. Shepard, *Committee.*"

The above resolution gives to the several boards of New England discretionary power to interchange licenses upon a common standard, and in one respect is not all that could be desired, as the standard should be embodied as a mandatory feature in the several statutes, and not be discretionary with the boards; but in the process of time the enactment of new laws is practically certain to cure these defects, and in the mean time we have unification and interchange among six strong states practically assured.

BIBLIOGRAPHICAL.

A Pocket Medical Dictionary. Giving the Pronunciation and Definition of the Principal Words used in Medicine and the Collateral Sciences, etc. By George M. Gould, A.M., M.D. Fourth edition, revised and enlarged. 30,000 words. Philadelphia, P. Blakiston, Son & Co., 1900. Price, flexible leather, $1.00.

In reviewing the previous edition we stated that we knew of no work which in so small compass contained so much that is reliable and accurate in the same field. The present revised edition still further confirms that belief. The book is easily within the physical limits of a pocket dictionary, and yet it gives the student and practitioner within its small compass practically all that they will ordinarily need in the way of a lexicon. The constant use of such a work would conduce largely to accurate and lucid medical writing and thinking, and avoid the careless use of technical terms too frequently indulged in by many in the attempt to express their ideas both verbally and in professional literature.

OBITUARY.

DR. WM. S. RAWLS.

DIED, January 13, 1900, at Las Cruces, New Mexico, from septic pneumonitis, WM. S. RAWLS, D.D.S., in his fifty-third year.

Dr. Rawls was born in Connersville, Ind., September 1, 1847. After a dental pupilage in the office of Dr. A. O. Rawls, he studied at the Ohio College of Dental Surgery, from which institution he was graduated with the class of 1879. His first location as an independent practitioner was Brookville, Ind.; during the latter part of his life, however, he was a conspicuous figure in the Indianapolis dental brotherhood. He was a member of the Indiana State Dental Association, in which he had filled the office of president. He was also a member of the Indianapolis Odontological Society, which body on January 13 testified to the respect in which he was held by passing the following resolution:

"WHEREAS, In the death of Wm. S. Rawls, D.D.S., the members of the dental profession have lost a distinguished co-worker and faithful friend; therefore, be it

"*Resolved,* That we, the dentists of this city and members of the Indianapolis Odontological Society, as a testimonial of our high esteem and personal regard desire to extend to his bereaved family and friends our sincere sympathy in this their hour of great bereavement."

Having learned about a year ago that tuberculosis was making some advance in one of his lungs, Dr. Rawls sought rest and recuperation in the dry, pure air of New Mexico. He spent much time in the neighborhood of Las Cruces, fishing and shooting, and soon began to gain in weight and to feel better in health than for years previously. About the 1st of January, however, he caught a cold, which gave rise to purulent inflammation of the middle ear, and this was followed by involvement of the cervical glands; then supervened the pulmonary complication, which, in about two weeks after the oncoming of the first symptoms of indisposition, proved fatal.

Dr. Rawls married, April 20, 1882, at Hartford, Conn., Miss Sarah P. Cummings, who, with a daughter, survives him.

DR. ALFRED J. WATTS.

DIED, January 22, 1900, at his home, Brooklyn, N. Y., ALFRED JOSEPH WATTS, M.D., from apoplexy, in his seventy-fifth year.

The passing from the stage of life of one who, while himself a physician and not a member of the dental profession, yet took an interest in it and by a happy invention affecting one department of our professional work appreciably contributed to the advancement of dentistry during the years of its most notable development, calls for recognition by at least a brief notice in our obituary pages.

Dr. Watts was born in England, at Chipping-Ongar, Essex, in November, 1825, and studied for the medical profession. In 1848, when twenty-three years of age, he came with his brother to this country. Settling in Utica, N. Y., he practiced as a physician there for a few years. He had, however, a special bent toward the physical sciences, and was the author of several scientific treatises. In April, 1853, he patented a process that he had discovered for preparing gold in a soft, pliable form specially suited to the requirements of dentists in filling teeth, his preparation being known as crystal gold, although from its appearance as seen under the microscope it was often spoken of as "fern-leaf" gold. He was granted a second patent relating to the same invention in December, 1860. Dr. Watts's gold came to be very much in demand, and on its introduction he relinquished medical practice in order to devote his time to its manufacture, which was conducted in Utica for the first few years, and from 1861 in New York. In 1870 he took up his residence in Brooklyn, where he remained until his death.

Dr. Watts was a member of the Union League Club, Brooklyn, of the Brooklyn Institute of the Arts and Sciences, and of two clubs in New York city,—viz, the Scientific Alliance and the Mineralogical.

In the loss of Dr. Watts one will be missed in whom was presented the especially valuable combination of intellectual brightness and absolute integrity. He could not tolerate inexact or careless methods in manipulation, and he expected the strictest accuracy in all business transactions. The standard that he set, however, was not set for others merely; none could ever accuse him of falling short of his own high ideal.

Dr. Watts leaves a widow, formerly Miss Florinda B. Brown, of Rome, N. Y., and one daughter. His son, who was associated with him in the business, died about four years ago.

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DENTAL LEGISLATION.

Dental Law of Iowa.

Following is the new dental law of Iowa, which passed both Houses of the State Legislature March 28, 1900:

Be it Enacted by the General Assembly of the State of Iowa.

Section 1. That chapter nineteen (19) of title twelve (12) of the code be, and the same is hereby repealed, and the following enacted in lieu thereof:

Sec. 2. The Board of Dental Examiners shall consist of five practicing dentists, who shall have been engaged in the continuous practice of their profession in this state for the period of five years preceding their appointment, one of whom shall be appointed annually by the Governor, and hold office for the term of five years, from and after the first day of August following his appointment, and until his successor is appointed.

The Iowa State Dental Society shall, at the request of the Governor, submit a list of dentists of recognized ability, from which he may select the member of the board to be appointed. All vacancies occurring in the board shall be filled in like manner, and the appointee hold office for the unexpired term of his predecessor.

All members of the present board shall continue in office, under this act, until the expiration of their present terms of office.

Sec. 3. The board shall organize by selecting one of its members as president, and one as secretary and treasurer, and shall meet at least once each year, and at such other times as it may deem necessary, and at such place as it may select. A majority of the board shall constitute a quorum, and its meetings shall at all reasonable times be open to the public.

Sec. 4. The board shall at any regular meeting, and may at any special meeting, examine applicants for a license to practice dentistry as to their knowledge and skill in dental surgery, and shall issue to such applicants as are found to be qualified a license authorizing them to practice dentistry.

The license shall be signed by each member of the board, attested by the president and secretary, and have the seal of the board affixed thereto, and shall be presumptive evidence of the right of the holder to practice dentistry in this state.

The name, age, nativity, location, number of years of practice of the person to whom a license is given, the number of the license and the date of the registration thereof, shall be entered in a book kept in the office of the secretary of the board, which shall be open to the inspection of the public, under proper restrictions as to its safe keeping, and the number of the book and page containing such entries shall be noted on the face of the license.

Each applicant for a license shall be a graduate of a reputable dental college, and shall pay to the board a fee of twenty dollars before a license is issued.

SEC. 5. The board shall have authority to take testimony in relation to all matters within its jurisdiction, and the presiding officer thereof, or of any committee appointed thereby, may issue subpœnaes for and administer oaths to witnesses called to testify before the board or such committee; and it may make and adopt all necessary rules, regulations, and by-laws not inconsistent with law necessary to enable it to perform the duties and transact the business authorized and required by this act.

SEC. 6. The treasurer shall, upon assuming the duties of his office, file with the Secretary of State a good and sufficient bond in the penal sum of one thousand dollars, conditioned for the faithful discharge of his duties; and shall keep a full and accurate account of all moneys received by him under the provisions of this act, and pay out the same upon the written order of the president, countersigned by the secretary.

SEC. 7. Each member of the board shall receive the sum of five dollars for each day he is actually engaged in the duties of his office, with the actual expenses incurred by him in the discharge of such duties, and the treasurer shall receive a salary not exceeding three hundred dollars per annum for his services as secretary and treasurer, which amounts shall be paid out of the fund received by the board under the provisions of this act, and from no other fund or source.

SEC. 8 The board shall make a biennial report to the Governor of its proceedings, including a full and accurate account of all moneys received and disbursed, and the president shall appoint an auditing committee, consisting of three practicing dentists of the state who are not members of the board, whose duty it shall be to audit the accounts of the board annually, and make a full report thereof, which report shall accompany the biennial report made by the board to the Governor.

Any sum of money remaining after the payment of the compensation and expenses of the members of the board and the salary of the secretary and treasurer, shall be by the treasurer paid into the state treasury on or before the first day of May of each year.

SEC. 9. Every person to whom a license is issued under this act shall file the same with the clerk of the district court in the county in which he desires to practice dentistry, and the clerk of the court shall be entitled to charge a fee of twenty-five cents for filing such license; and a failure to so file such license within one year after the same was issued by the board shall work the forfeiture thereof.

SEC. 10. It shall be unlawful for any person to practice dentistry in this state without having complied with the provisions of this act, and any person who shall violate the provisions thereof shall be deemed guilty of a misdemeanor, and upon a conviction shall be punished by a fine not exceeding two hundred dollars or imprisonment in the county jail not more than forty days, or by both such fine and imprisonment.

SEC. 11. No member of a dental college faculty, or no person connected therewith, shall be eligible to an appointment upon the State Board of Dental Examiners.

SEC. 12. Nothing herein shall be construed to prevent physicians and surgeons from extracting teeth in the practice of their profession, or to prevent *bona fide* students of dentistry, in the regular course of their instruction, from operating upon patients at clinics, or under the supervision and in the presence of their preceptors, but no fee or salary for such operations shall be received, either directly or indirectly, by any such student of dentistry. And nothing herein shall be construed to prohibit the practice of dentistry in this state by any practitioner who has been duly registered in accordance with the laws of Iowa existing prior to the passage of this act; or any person who is a member of an incorporated society or community and practicing dentistry solely for and among the members of such community or incorporated society, without charge or compensation.

HINTS, QUERIES, AND COMMENTS.

To the Editor of the Dental Cosmos:

Sir,—The most remarkable case met with in my nine years of practice came for my attention this week. A lady came in my office complaining of her teeth not fitting. She wore an entire upper and lower plate. I saw at once that the work was not done for the patient, and on questioning was told that her mother, about thirty years ago, had died and left her these teeth, and that she (the daughter) had worn them with satisfaction up to recent date, but now they no longer remain in her mouth. While this seems absurd, I vouch for the fact of her having worn them, and that they were her mother's teeth. As to date I am only depending upon her statements, but am fully satisfied that all is true.

I write this as a matter of interest to the profession, and also to have it put on record as a very remarkable case.

Beaufort, S. C. W. M. Steinmeyer, D.D.S.

To the Editor of the Dental Cosmos:

Sir,—I had an experience following the injection of eucain for the extraction of teeth which I would like to have published in your query department, to ascertain from others if they have had any similar results with eucain.

On Thursday, October 12, I injected about twenty minims of a four per cent. solution of eucain B around three teeth, the upper left first bicuspid and both lower third molars. Two of them I extracted, but the right lower third molar I broke off, leaving the roots in.

The next morning there was some swelling, which continued to grow worse, and by noon became quite marked. It continued to get worse until on Monday, four days after the operation, it became quite alarming and the family physician was sent for. He described the condition he found as follows: The tongue, sublingual and glossus muscles were swollen to such an extent that the tongue was pushed out of the mouth one-third its length, and respiration was so much impeded by the enormous swelling of the glands that it seemed for a few hours that nothing short of tracheotomy would save the patient's life. However, the following day the thickened mucous membrane lining the mouth and fauces as far down the throat as the pharynx sloughed off, leaving the parts bare and bleeding. At this stage the swelling of the glands began to disappear, and respiration became more easy. In about ten days from the commencement of the attack the patient recovered. The swelling was more marked on the right side.

The patient was a farmer's wife, twenty-four years old, and she did not take any care of her teeth.

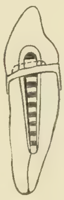
Do you think it was caused by the eucain? If not, what was the cause?

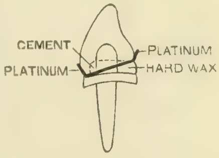
W. L. Overholser.

Winamac, Ind.

An Improvement in the Construction of a Banded Logan Crown.—I have just been trying something that occurred to me a few days ago, as new, in making a banded Logan crown. After fitting the gold cap on the end of the root, and grinding the crown up to fit with the V-shaped opening to the lingual side, there was still a concavity around the pin in the crown, which could not be perfectly filled with the metal fitted against the crown and would not do to leave, as in case there was not a perfectly water-tight fit after soldering there would be left a receptacle for secretions, which would give an odor to the breath. I knew cement would fill the cavity, but did not know how it would stand the heat in soldering. So I tested some of Ames's metalloid crown and bridge cement with a blowpipe flame, and found that at first it expanded, became porous, and was easily broken. On increasing the heat to about the soldering point of 18 k. gold solder the cement flowed and contracted to about its original size, and became a solid mass that was glassy on the surface, very hard, and brittle.

The test seemed to indicate that it would serve my purpose. Mixing some cement to a creamy consistence, I filled the cavity in the crown around the pin just level with and extending slightly over the ground surface. Then a thin piece of platinum in which a hole had been made was passed over the pin and up against the crown. The pin was then inserted into a cork up to and slightly imbedding the crown, and held there firmly for a few moments until the cement had time to set and hold the platinum fast. The overhanging edges of the platinum were left so as to be caught in the investment.





Hard wax was placed over the platinum around the pin, warmed, and pushed into position on the cap and root. When the wax was hard, the crown and cap were removed, invested, and soldered as usual.

In soldering, the platinum held its place, and when completed there was a perfect joint. The advantages in this method seem to be: 1. The ease and rapidity of fitting the platinum to the crown. 2. The certainty of its remaining in position while soldering. 3. The certainty of filling the cavity around the pin. 4. Making the most perfect joint between the metal and crown.—W. O. Talbot, D.D.S., Biloxi, Miss.

To the Editor of the Dental Cosmos:

Sir,—I take pleasure in sending you some results of my studies of the teeth of school-children of our country, and will state a few points regarding oral hygiene among our schoolboys, upon which subject I wrote calling the attention of their parents and guardians to its importance in the *Kin Shu Hinode Shinbun,* No. 23, January 27, 1900, a daily newspaper published in Nagasaki, Japan. The children study every day except Sunday at the Japanese schools. The scholars are of both sexes, ranging in age from six to fourteen years, but my studies were made principally of the boys at the few schools of Kwan Sai, in the central portion of Han Shu, Japan. I found caries of the lower molars prevalent to the extent of seventy-four per cent., caries of the bicuspids being next in order of frequency. Gingivitis was frequently observed.

Very few, only about fourteen per cent. of the boys examined, from ten to fourteen years of age, possessed complete dentures for the ages named. Eighty-five per cent. had some diseased teeth; dental caries in molars thirty-one per cent.; twenty-five per cent. had irregularities of the teeth; deformities of teeth nine per cent.; gingivitis four per cent.; deposit of tartar two per cent. In a very few cases supernumerary teeth; fractures of the teeth and white spots upon the enamel of the teeth were observed. In the cases of boys from six to ten years I found fifty-five per cent. had caries of the first molars, forty per cent. had disease of milk molar teeth, and many cases of malocclusion or irregularity of the teeth.

Therefore, I consider it both interesting and important to study methods for protecting the teeth of school-children, and preventing caries, malocclusion, and irregularity among them. KINGIRO KAYANO, S.D.

8 MOTOFURNKAWAMACHI, NAGASAKI, JAPAN.

RETAINED TEMPORARY MOLAR IN UPPER JAW.—Having met with a peculiar case I send a description of it, trusting that it may be of interest, as cases of this kind are not often met with in ordinary practice.

The patient, a young lady about twenty-eight years of age, on presentation, informed me that she wished an abscess lanced. Upon examination I found a large abscess, with fistulous opening, upon gum (one of the old chronic kind), above the space between the lateral and second bicuspid, upper left side.

Questioning her as to the absence of the cuspid and first bicuspid, she informed me that they had been extracted in March of this year to relieve this same condition, but without success. This led me to suspect a portion of one of the roots remaining to be the cause, but, upon further examination with a probe through the fistula, I was puzzled to feel it touch enamel. Enlarging the opening, I could detect, with an excavator, that the substance was perfectly loose and lay about in the position that the end of the root of the first bicuspid should occupy; so I removed it and found it to be the crown portion of the *first temporary molar*.

The only history of the case that I can obtain is that about three years ago the abscess appeared and was lanced; she had been troubled with it at irregular periods ever since. In March she was advised to have both cuspid and first bicuspid extracted, which she did, but the abscess was not relieved. —V. E. MITCHELL, Bayonne, N. J.

◆

LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MARCH, 1900.

Mar. 6.—No. 644,583, to JOHN H. DOYLE. Artificial denture.
“ “ No. 644,640, to GIDEON SIBLEY. Dental chair.
“ “ No. 644,641, to GIDEON SIBLEY. Dental chair.
“ “ No. 644,642, to GIDEON SIBLEY. Dental chair.
“ “ No. 644,643, to GIDEON SIBLEY. Arm-rest for dental chairs.
“ “ No. 644,644, to GIDEON SIBLEY. Back-rest for dental chairs.
“ “ No. 644,705, to GEORGE EVANS. Impression band.
“ “ No. 644,803, to HENRY J. JUSTI. Artificial tooth-crown.
“ “ No. 644,932, to CLINTON W. MILLER. Dental tool.
“ “ No. 644,970, to THOS. G. DONALDSON. Dental flask.
“ *13.*—No. 645,345, to LUTHER A. YOUNG. Dental broach.
“ “ No. 645,413, to EDWARD WISHART. Dental separator.
“ *20.*—No. 645,608, to CHAS. SCHAKE, JR. Dental plugger.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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ORIGINAL COMMUNICATIONS.

HAS LEGISLATION CURED QUACKERY?

BY DR. NORMAN W. KINGSLEY, NEW YORK, N. Y.

(Read before the New York Odontological Society, February 20, 1900.)

THE title of this paper suggests both a disease and a doctor, and in our treatment of the subject we must first diagnose the disease.

What is quackery?

The dictionaries define a quack as an ignorant and fraudulent pretender to medical skill; a knavish practitioner of medicine; an impostor; a cheat; and, I may add, any method in the practice of a profession which tends to degrade it in the estimation of the community is quackery.

In its original use, the word undoubtedly meant noisy, loud-mouthed, blatant, and in its broader and more modern use it is applied to any assumption of knowledge or skill which one does not possess, whether in medicine, dentistry, law, theology, politics, or religion.

If imposture, fraud, and deceit constitute quackery, where stand the curists and the pathists? The alleged scientists, whether Christian or Jewish, Gentile or Mohammedan, the osteopath, the homeopath, the hydropath, and even the regular allopath who writes a prescription for an innocuous mixture and takes his fee therefor? His prescription hasn't even the merit of the shot made by the hunter who, when asked what he was aiming at, said it was something to kill, if it was a deer, but to miss it, if it was a calf. Quack has become synonymous with empiric, charlatan, and mountebank.

The empiric is here in bad company. He is not a fraud and is not dishonorable *per se*. He is not necessarily a mountebank selling nostrums from the tail of a cart with a hand-organ accompaniment. The empiric experiments and is guided by his experience. When a sufficient number of experiments are collated to establish a fact, and a sufficient aggregation of related facts to show a system, it becomes a science. The greatest empiric in electricity of our day is recognized as the most accomplished scientist.

All that is scientific in dentistry has been built during the century now ending upon empiricism, but not always by charlatans nor quacks. Nevertheless, the most noted quack in dentistry of seventy years ago introduced a material, which, in its varying modifications, has saved quite as many teeth from further decay as any other material. He was a prince among empirics. The quackery was not in the material used, but in the unskillful manner of its use, and in the blatant pretension with which it was heralded.

Harris, Townsend, Maynard, Westcott, Atkinson, and Dwinelle were all empirics, but not quacks. Perhaps, within our own time, Atkinson was the greatest empiric of them all, but Atkinson was not a charlatan.

We have all of us been empirics (those of us who have any brains); it's only the conservative dolts who haven't been. The number of inventions, operations, remedies, etc., which I have seen exploited with a bombastic flourish only to be rejected after a short life, if materialized, would fill a museum. There they lie on the shelf like grinning skulls in the Catacombs.

In the first half of this century, nearly all dentists were regarded as quacks by the medical fraternity. They were empirics, but not charlatans. There *were* quacks as there always are in any vocation. But, relatively, there was not nearly so much quackery as exists to-day. Fifty years ago in this city there was very little quackery. The profession contained many honored names,—gentlemen of culture and social standing. In the fashionable functions of that day were to be found the names of dentists distinguished alike for their skill and good breeding. The quacks were peripatetic, itinerating from one place to another, but even they were not guilty of the crimes in the name of dentistry that are so frequently found to-day. The profession as a whole did not accomplish as much good as it does now, and on the other hand the quacks did far less harm.

As I look over the field at the close of a half-century's observation, I see three grades of dentistry. Dentistry as a profession, dentistry as a trade, and dentistry as a side show to a circus. Each of these grades carries its own customs, which are a law unto itself.

A profession, by habit of thought and common consent, is a dignified vocation with a pretence at ethics. A trade may be equally dignified, but its ethics are not so rigid as those of a profession The side shows of the circus are classed with the mountebanks, and while their acts may not make them amenable to criminal law, they are nevertheless regarded as cheats.

There is nothing morally wrong in your putting up a tent outside the circus and with a brass band exhibiting a fat woman and a two-headed calf for a shilling to those who would give a shilling to see a fat woman and a two-headed calf. Such people pay their money and get what they pay for. There is morally no imposture, for the man with the shilling when once inside can judge for himself whether the woman be fat and the calf has two heads.

The dental side show chooses for its circus one of the greatest shows on earth (outside of Barnum's), a modern department store, where, in the dental "parlors," are to be found the figurative fat woman and the two-headed calf. The blare of the brass trumpet is represented by the advertisements in the cheapest daily newspapers, and all the arts of the mountebank are used to entice the victim. "'Will you walk into my parlor?' said the spider to the fly."

When the verdant rustic views the real fat woman and the real two-headed calf, he knows that he has received what he has paid for, but when he gets within the confines of the dental side show he is at a disadvantage, for he is not an expert on dental operations, and however so much he may get that which he paid for, the methods of the concern savor of the mountebank, and the active participants are rightfully denominated quacks. They can have no standing among honorable men. Their influence upon the community cannot but be degrading to a dignified and honorable calling.

Dentistry as a system of organized and legalized quackery reaches its fullest attainment in the "dental emporiums" of the avenues and streets in which ethics play no part, and the chief and only object is to make money by all the devices known to trade; the main factors being advertising and underselling your neighbor.

In trade we see the most alluring of advertisements in large type filling columns, and sometimes covering whole pages, of the daily newspaper, setting forth in the most attractive manner the quality and cheapness of the goods offered. Such advertisements are the claptrap which the brass band furnished to the circus. They are the methods of the mountebank, but when the statements are within the limits of truth the methods are legitimate, because it is a trade and not a profession, the ethics of trade being limited to "honesty is the best policy."

In trade we see an establishment with a head, backed by capital, with many employes and a superintendent over them, the real head being rarely visible to the employes. The most rigid discipline is maintained, the employes being not much better than servile slaves.

When dentistry is carried on as a trade, we find the same methods prevailing; an establishment with the effort to dignify it by calling it a dental emporium; a very swell darkey in uniform, with the air of a general, at the outside to give importance; a superintendent and hired employes under constant surveillance like so many criminals; the same kind of advertisements even to the full page, and the same effort to undersell his neighbor. All professional ethics have been thrown to the winds, and even the ethics of trade, "honesty is the best policy," are not regarded.

All the characteristics of the mountebank are there, and notwithstanding the employes may have the diploma of a "reputable dental college," and are duly registered, the establishment is an establishment of quackery, and all the employes are tainted by the association.

When dentistry is practiced by gentlemen and regulated by the ethics of gentlemen, irrespective of a cast-iron code of ethics, it becomes an honorable profession. There are no claptrap brass band efforts to entice nor allure. There is no competition in fees. The chief ambition is to excel in skill, believing that in that road lies the surest way to a competence.

Legislation relating to dentistry had its origin in the middle and western part of the state. Whitney, of Buffalo, Westcott, of Syracuse, and Rogers, of Utica, were the most active promoters. I was not in their counsels at the time the act was passed, but became identified with their movements immediately afterward, and to a considerable extent in their confidence.

I do not think that the suppression of quackery formed any prominent part of the objects they wished to attain. *That* thought was an incidental one. The primary idea was the elevation of the profession in itself, and in the estimation of the community. Organization under an act of legislature would crystallize the profession and stimulate an ambition for better things. The existence of incompetency was recognized in the provision made for censors in each of the eight districts of the state, which boards were empowered to grant licenses (upon examination) to practice in their respective districts. I do not think that the founders before named had any very clear idea of how their plan would work in practice.

The State Board of Censors, during the first year, could only give a license to practice, but, subsequently, they were empowered to recommend to the State Society the conferring of a degree. This was quite a step in advance, for whereas, at the first meeting of that board, nearly every one who applied received his certificate, at the second meeting they realized the greater responsibility, and the examinations became more searching, and during the sixteen years of my connection with that board it was not uncommon for fifty per cent., and sometimes seventy-five per cent., of those who applied to be rejected.

The power to confer a degree was criticised by the dental colleges, who seemed to feel that it was encroaching upon their special prerogatives, but in its day it served an admirable purpose. The ambition to possess a degree stimulated many a man to prepare himself for an examination, which was commonly reported to be excessively severe. Certain it is that graduates from dental colleges could not always pass and were plucked equally with non-graduates. It used to occur to me sometimes, in one of my cynical moods, that one of the advantages growing out of the law was commonly overlooked.

It gave such a splendid opportunity for a lot of us to pose for the time being as a little above the outlanders by being made officers of different grades, for if there is anything that the average man does love it is to be lifted into a place of alleged superiority to his fellows, and for this attainment he will log-roll for himself, and resort to no end of tricks to beat his competitor. No matter how humble or inferior the club, society, association, stock company, or political party, they are all possessed of the same ambition and tarred with the same stick. Hence we see the first fruits of dental legislation was the creation of opportunities for office holding: eight district societies, each with at least four executive officers and five censors; the State Society with five or six more, and last, but by no means least, that particularly select and high-toned board of which I had the honor to be president for sixteen consecutive years. Just think of it! Eighty-six officers in all. There was a time almost within my own remembrance when there would not have been any chance for privates.

The first legislation aimed directly at regulating dentistry was the act of 1879, which allowed all the quacks, charlatans, and incompetents then in practice to continue in practice by registering as provided, but would let no more in after a certain date without diplomas. It did not separate the sheep from the goats, and it made the goats, by legislative act, all sheep. It was a kind of trades-union that wouldn't let any more in without conditions.

After nine years' faithful effort to suppress incompetency, the law was found insufficient for that purpose, and the aid of the legislature was again called. I will not attempt to detail or describe the amendments on amendments that appeared perennially. Hardly a meeting of the State Dental Society has been held when the chairman of the Law Committee has not suggested the necessity for further amendments. I have reason for believing that the best legal talent has been employed in framing these statutes, and there has been no lack of zeal in enforcing them.

What has the law accomplished? It has certainly raised the standard of professional education. It is no longer possible in this state for the barber to call himself a dentist because he has a chair. It is no longer possible for the shoemaker to turn his awls into excavators and pluggers and tramp as a dentist; nor for the jeweler, because he is skilled in gold and silver work, to undertake dental prosthetics. The law exacts that he who would essay to practice dentistry must have, before entering upon its special studies, a preliminary education far in advance of any that would be required in the trades just mentioned; an education which at least lays the foundation for culture.

Has legislation cured quackery?

There are certain diseases and vices which all the legislation in the world up to the present has failed to abate. They continue to flourish in spite of all the sumptuary or prohibitory laws on the statute books.

Intemperance is conceded to be a disease and a vice, and legislation has been invoked for generations to prevent it, but without avail.

Quackery is a vice, and figuratively a disease. It has not been stamped out by legislation. It is not even abated. It is on the increase, and, most discouraging of all, the community does not look upon it as disreputable or unethical. The mortifying fact stares us in the face that, in the estimation of a large portion of the community, these people are dentists just as much as we are. You and I may know that we are of a different order, and so do our personal friends, but to the people at large we are dentists, and so are they.

To see one's vocation, which is in itself humanitarian in character, which within its sphere is second to none in the personal benefits it confers, whose methods call for the exercise of more than the average of intelligence and skill, to see such an honorable calling dragged through the mire of charlatanism, makes every one with any *esprit de corps* blush with shame and mortification at the name of dentist. I have noted in some quarters an effort to correct such a feeling by a change of name, but say what you may, and do what you choose, our mother tongue has fixed irrevocably your designation. One who treats teeth is a dentist, and as ninety per cent. of your duties relate to the teeth, you are dentists. Call yourselves stomatologists, odontologists, or what not, you cannot get rid of the fact that you are dentists, and if there is any opprobrium attached to that designation, you had far better devote your energies to removing the stigma than to crawl from it and expect to improve your status by calling yourselves by another name. Odontological or stomatological is well enough for the name of a society to distinguish it from some other society, but its members are dentists all the same.

I do not know what the outcome will be. In this age of gold, iron, capital, industries, thrift, and trusts, are we drifting away from the strictly professional idea? As a profession, we hold an anomalous position. Much as we may cry professional because that term has been regarded as a little more high-toned than trade, much of our technique differs in no way from the methods of the industries. Industries employ hired labor, and trusts combine industries. So much there is in the practice of dentistry that can be done by hired labor; so much that is really mechanical labor instead of the intellectual, as in the law, theology, medicine, literature, or the stage, that it may be the inevitable drift of the age that what we call quack establishments, because of their methods, may be the forerunner of the bulk of dental services rendered in the future, particularly in cities and densely populated districts. We already see that legislation does no good in the attempt to abolish them. But little is gained by any effort to have the community regard them as disreputable.

A certain class in the community is always looking for bargains. The vast majority is reared in moderate circumstances, and must look closely after their finances. They get bargains by shopping. They get good goods by looking about. They can see no particular object in paying any more in one place than another for anything they may want, and from their standpoint an establishment which can for any reason supply their wants at a less cost will be patronized, *and particularly if you have guaranteed, as you have by legislative act, that the individuals employed are skilled men.* What argument can you make to the shopper against the quacks?

You and I who have established a clientele upon which we can fairly rely for our few remaining years may not worry over it, but I distinctly see a menace to the prosperity of the thousand young men annually entering the ranks of dentistry. The encouragement to the newly-fledged graduate to put out his sign and ethically await a caller is so very slender that the question of sustenance forces him into an "emporium," where the stipend to say the least is not mean. How you will meet this condition which confronts you I cannot foresee.

My half-century of activity entitles me to rest. It is upon you who are younger, more courageous, more enthusiastic, that the decision will devolve whether you will accomplish your most laudable object—the betterment of your vocation—by jumping upon them with prohibitory laws, or recognizing the inevitable endeavor to correct its abuses.

In closing, I wish to pay my tribute to that one man who stands out conspicuously for his devotion to this object. He has handled the authority with which he was clothed with consummate judgment and untiring zeal. That all the quackery has not been suppressed is not his fault. That it flaunts defiance in his and our faces to-day is due to the inherent cussedness of those who would stop short of nothing but state's prison to gain another dollar.

In my address as president of the State Society twelve years ago I said, and I now repeat, "When this society makes up its roll of honor, the name of the chairman of the Committee on Dental Law will stand second to none."

DENTAL PEDAGOGICS.

BY A. E. WEBSTER, D.D.S., M.D., TORONTO, CANADA.

(Read before the Institute of Dental Pedagogics, December 27, 1899.)

THE subject of pedagogics is a vast one. It is undoubtedly more extensive than the whole subject of dentistry. In one respect it is similar to it, being a science and an art of the last century, in fact, we may say of the last two decades. To present both the psychology and methodology of the subject in one paper would take more time than is allotted to the subject on the program.

College professors of the twentieth century will look to their methods as well as to their matter. They will be great teachers, as well as proficient scholars. The average professor in the past cherished a deep contempt for methods. He counted it presumption to call education a science, and teaching an art. But a marvelous revolution is going on. Students who elect teaching will be educated for their profession. College professors of the future will be as noted for their great skill in teaching as for their great learning.

The time was, when a large practice was a sufficient qualification for a position on the teaching staff of a dental college. Later, and even now, the idea prevails that knowledge of the branches to be taught is all that is necessary to the equipment of the teacher,—that to know a thing, is to be able to teach it. One who knows how to make a beautiful piece of bridge-work is not necessarily able, because of that knowledge, to teach bridge-work well. Nor is ability to teach made up of the subject-matter, plus knowledge of the modes of growth and the operations of the mind, but it demands a thorough knowledge of mind, matter, method.

In the study of this subject we should expect to put forth an effort to attain the best results. We must expect to gain a knowledge of it by the same processes as our students gain a knowledge of dentistry. If we are the pupils of the "School of Dental Technics," as our name implies, we should work in sympathy, not expecting a very great deal from any individual, but a great deal from the whole membership. Just as we find it in those happy institutions of learning where professors and students are in perfect sympathy one with the other, having a common object, that of getting the best out of a college course. Just here I cannot refrain from the remark that in such institutions there is nothing heard about rules of conduct, nor harangues on discipline.

In a general way, what might be considered a good method of presenting a subject to a dental student, should be considered a good method of presenting a subject to this association.

Our best teachers do not believe that a stereotyped written lecture or lesson is productive of the best results, nor does the writer see why all the subjects presented before this association should be written out in full. Of course, scientific subjects are best presented in exact form, but those of a practical character are better presented according to the exigencies of the case at the time of presentation. Accordingly, the scientific portion of this paper will be read, while that portion pertaining to the art of teaching will be demonstrated.

All will agree that three terms at a dental college is too short a time to master the whole of dental science. This being true, why should we wander over the whole field without knowing whether our students are obtaining anything substantial or not? The true teacher lays such a foundation that the student is capable of filling in the details for himself, thus giving to him the pleasure of conquest. Again, the true teacher imbues his pupil with such an interest and enthusiasm in the subject, that it is studied with pleasure after he leaves college.

The great essential in all teaching is to create in the pupil an interest and enthusiasm in the subject. One of the best means to this end is by the direct method of teaching, having no hints, aids, or assistance to memory that are not allowed to the pupil. The teacher should put such energy and feeling into his teaching that the student will be carried away and the teacher in turn will feel that sympathetic touch that comes from the student. Have you ever felt it? If not, put more soul into your work.

Instruction is usually given by one of the following methods: Lecture, demonstration, Socratic, recitation, or some combination of these. Let us briefly consider these methods and their adaptability to our needs as dental teachers.

By the lecture method of teaching is meant a direct continuous exposition, without the aid of demonstrations, practical exercises, quizzes, or recitations. This method is rarely strictly adhered to, except, perhaps, in theological colleges. Very few professional colleges of the present day depend entirely upon this method for the instruction of their students. The demand in medical and dental colleges for more demonstrations, clinics, practical exercises, quizzes, and recitations is increasing. This demand is in the right direction, and is based upon correct principles.

The lecture method has the advantage of being more rapid than any other method of teaching, and is also adapted to the instruction of large classes. The great disadvantage of this method is that the teacher does not need to know the subject-matter, the pupil, or himself. He needs little or no energy; in fact, he may read or dictate his whole course of lectures. He may follow a rut for years, and keep his classes quiet by forcing them to take notes which are rarely ever read afterward.

The demonstration or clinical method of teaching consists in the presenting and describing of objects, and the performing and describing of procedures. Objects, drawings, models, and photographs are used to advantage in this method of instruction. This is the only true method of presenting the first lessons in a scientific subject. Note this, object first, description immediately after, then practical exercise. The child gets its first ideas from the sensations of touch and sight. The adult the same. Presentative ideas must precede representative ideas. After the pupil has a full stock of sensations out of which to make representative ideas, lectures and descriptions may be given without the aid of objects. To apply this psychological principle, which should come first,—practical chemistry or theory of chemistry, practical anatomy or theory of anatomy, practical histology or theory of histology, practical materia medica or theory of materia medica, practical exercises in dentistry or lecture of dentistry? I leave this question with you.

The demonstration method is slow, and always defective unless followed by practical exercises and recitations. The teacher must have a thorough and wide knowledge of the subject, and be competent to do anything that he asks his pupils to do.

The recitation method should hardly be given the dignity of being named as a method of teaching. It consists in setting lessons in a text-book, which are to be learned by the student and afterward recited upon. This method is entirely obsolete in all primary schools. It is the method adopted by the old-time schoolkeeper. It requires the least possible amount of energy and knowledge from him. It has the great advantage of compelling the student to *work*. At the present time there is a tendency to introduce this method into dental and medical schools. One book is learned by heart and the examination is set upon it. To say the least, this is narrowing and restricting mental growth.

The Socratic method of teaching leads the pupil by judicious questioning to form new conceptions. This method has the advantage of getting the undivided attention and thought of the pupil, perfect order in the class-room, the teacher knows the exact capacity of the pupil. This method demands of the teacher a thorough and systematic knowledge of the subject, and a great deal of skill and energy in the art of questioning. He must also know either the names or numbers of his pupils. The plan of teaching the lesson must be prepared. The questioner must have a trained intellect. He should possess analytic power. One thing at a time, and it in its logical connection. Disconnected questions are the product of a muddled brain. The illogical mind cannot teach because it does not reach correct conclusions, nor does the pupil see the connection or relation one question or subject bears to the one preceding it. These demands are so great that but few teachers are following this method of instruction in our dental colleges.

By the combination method of teaching, is meant an adaptation of the method to the subject and to the capabilities and progress of the pupil. Such subjects as dental ethics and general rules of practice may be taught best by lectures, quizzes, and recitations, while anatomy, materia medica, prosthetic and operative dentistry are best taught by demonstrations, clinics, practical exercises, lectures, quizzes, and recitations. (Note the order.) Well-directed questions at proper intervals before, during, and after a lecture will arouse attention, while, at the same time, the answers will indicate to the teacher how well the subject is being comprehended. Thus there is no waste of time in lecturing upon subjects already understood, nor does the teacher lecture over the heads of his pupils.

Recitations, conducted as reviews, are very helpful to retention and to make clear ideas that were at first hazy. Practical exercises that follow demonstrations and clinics are reviews, plus the manual training. The idea must be present before the hand can execute. Written examinations have an educational value when properly conducted. The reproduction of knowledge is a sure sign of its presence. The teacher should avail himself of every means possible to assist his pupil to gain and retain knowledge.

Psychology bears the same relation to the science of education that anatomy, physiology, and pharmacy bear to the practice of medicine. It is as necessary that the teacher should know something of the mind's activities as it is that the physician should know the bodily organs and their functions, their normal and abnormal conditions.

The teacher should be able to tell why he teaches anatomy or physiology, and why he teaches them in a certain way, as the dentist should be able to tell why he puts a crown on one root while he extracts another. Just as the dentist should know the specific effect of any medicine on the tissues of the body, so the teacher should know the effect of a given college exercise or branch on the different faculties of the mind.

BASIS OF INSTRUCTION.

(*a*) Always base instruction upon some activity of the pupil,—*i.e.*, interest, habit, impulse, activity.

There must be personal or self-activity. Education is the development of the psychical activities. What stimulates to activity once is not likely to do so again.

(*b*) Always base instruction upon some interest of the pupil. May be interested because of sympathy, desire of progress, of knowledge, or its manner of presentation. (Note what excites interest.)

Interest is an emotion, not an intellectual act. Out of this interest grows attention.

(*c*) Always base instruction upon some idea already existing in the mind.

A new idea must be lodged about an idea already there. We always learn with what we already know. An idea (however vague) of what is to be done must precede any doing.

AIMS OF INSTRUCTION.

(*a*) Aim at making instruction significant. First make each subject, as a whole, significant; keep the whole subject in relation or bearing with what the pupil has already done in the subject.

Explain every new law, fact, or statement so that it may be translated into old perceptions.

(*b*) Aim at making instruction definite. Every lesson should have a point and every question upon that lesson should have a point, precise, salient. Unambiguous, irrelevant matter should be excluded; the teacher should avoid the introduction of confusing examples. Objects presented must plainly illustrate just the point desired. A great deal of scientific experiment and illustration is wasted because the student observes only the most attractive point. Every expression of the pupil must be definite, but the teacher must remember that ideas are at first cloudy and vague, and are only made clear by the student's mental activities being aroused to work upon them.

(*c*) Aim to make instruction practical. Instruction is practical when ideas lead to action and action is based upon ideas, that is, that it may give the student the power to act. So instruct that the student may organize his faculties and powers to develop association and attention, apperception and retention.

METHODS OF INSTRUCTION.

(*a*) Teach one thing at a time. Why?

Because (a) it economizes mental energy, (b) defines mental products, (c) excludes irrelevant material, (d) prepares the way for memory, (e) fosters the analytic habit. A well-trained mind grasps the salient points in a subject first. Teach the whole before the parts.

(*b*) Teach in a connected manner. It demands of the teacher:

1. Unity of aim or an educational ideal. Have a broad practical ideal; aim to teach correct habits of mind.

2. That the teacher be systematic. Have a definite aim for a whole term's work and carry it out in a systematic order; leave all details to existing conditions at the time of lecturing.

3. That instruction be graded,—easy to difficult, simple to complex, familiar to novel. In this connection it might be well to call attention to the too frequent condition in some of our schools of having the same class listen to the same lectures in two different years. And what is worse, these lectures are identical for years, and in some cases, dictated, being copied verbatim by the students. And what is still worse, the examination is set on what has been dictated.

A. The synthetic method demands that knowledge begin with presentation, because all representative knowledge must be capable of translation into presentation. By this method, the faculties of the mind are trained in the order of their development, perception, memory, imagination, reasoning. The two factors in training perception in order to establish a connected growth from it, are,—first, identifying the presentation with what has already been presented (recognition); second, the discovery of something implied in the perception, but not apparent on its surface (differentiation).

New knowledge is only obtained by discovering its relation to old, and the old is strengthened, extended, and developed by the new.

B. The synthetic method demands that facts be connected by the laws of association, and by the relation of unity and difference, so that they form centers or groups of ideas. An isolated fact is learned by the pupil only through sheer force of impressing it upon the mind. In youth, this method may succeed so far as collecting a number of facts is concerned, but there is no power given to organize new knowledge. Simply dead matter obtained after the expenditure of a great deal of force. While facts are learned by association and relation, they serve as centers around which allied ideas gather, thus helping to carry others instead of having to be carried by the energy of the mind.

C. The synthetic method demands that the groups of ideas thus formed be used as organs for acquiring new knowledge.

First.—Old knowledge should be reviewed, grouped, and classified. The serial order should often be changed to the topical. The pupil should be often required to rearrange the principles of a subject.

Second.—The mind must be prepared for new ideas by stirring up ideas already there, reawakening an interest and showing how these ideas lead naturally to others.

Third.—Old knowledge must be exercised and its relation to the new shown. Keep the old separated from the new and they are retained with an effort, but united one assists the retention of the other.

The analytic method demands that the teacher should first present the whole, then parts; first, outlines or groups, then details; *e.g.*, a child sees a man first as a whole body, then legs and arms are made out; later, head, face, eyes, fingers, toes, and so on, until the whole detail is completed. This is the groundwork of our present methods of instruction. Our children are taught first the sentence, then the word, and then the letter. Nowadays, we frequently see children who can read well and do not know half of the alphabet. I venture the question,—Are we teaching anatomy, physiology, materia medica, and pathology correctly? Do we give our students a grasp of the whole subject first, then take up its parts and so on down to details, or are we, as in physiology, beginning with details,—*e.g.*, cell and tissues, and then giving the whole? These questions I leave for your consideration.

Studies are valuable for two reasons,—for the culture they afford, and for the use that can be made of them. In primary education, the culture a subject affords is of chief importance; while in professional education, the usefulness of the knowledge obtained from the study of a subject is of chief importance.

Grant that the subjects taught in a dental college should be useful; that usefulness does not hinder them from being valuable as a means of mental culture, if taught according to psychological principles. A subject taught contrary to the natural channels of the mind, cannot afford a means for mental growth. Anatomy is most admirably adapted to the education of perception (a faculty of very great importance to the dentist), but how can a student's perception be educated if he does not see the cadaver before he reads his "Gray"? The faculty of memory may be educated by every subject on the dental curriculum if taught according to the laws of memory. How can attention and concentration be educated if the teacher lacks the power to gain and maintain the attention of his pupil?

Physiology is well adapted to the education of the analytic habit of mind if taught properly. Hear what Professor Roark says: "A logical presentation of physiology would begin with the cell and tissues of the body and trace their combinations into organs and systems. But it would be unwise to teach the subject in that way. Tissues and cells should be the last things taught." Pathology, operative and prosthetic dentistry, and orthodontia afford the greatest possible opportunity to educate conception, thought, judgment, and reason, if taught properly in the lecture room and infirmary.

Sympathy is the greatest governing and educating power at our command. Where there is sympathy there is interest and all that flows from it. To teach well, the teacher must get very near the student. It is impossible to get near a student without knowing him, and the workings of his mind. This winning of affection and confidence can only be done by having sympathy for the learner in his efforts and in his failures. A man that has but little sympathy can never be a teacher in the best sense of the word. He may be a hearer of recitations, an expositor of subjects, a martinet of discipline, an enforcer of spurious attention, a prince of rule and routine, but he has no power to touch the heart. It is hard to get implicit trust from students, but it is won through sympathy. In the general management of a college it is felt, but especially in the class-room where teaching is done by the interrogative method does the questioner's sympathy reveal itself and win the interest of the pupils. He is interested in instruction for their sakes, and they become interested in it for his sake, because they have utter confidence in him.

The true teacher always knows when his mind is out of contact with the minds of his pupils. He has at first pitched his questions or exposition too high or too low; he has failed to excite interest because he has failed to create the necessary relation between their old mental experiences and the new. But he soon corrects his error; he quickly touches the responsive chord, and he feels, and the students feel, that teacher and taught are one in thought and aim. Now, while the entire atmosphere of the college is one of sympathy, and thus influences the general college life, it is in actual teaching, especially by the method of interrogation, that it works with personal power. There is a focusing, so to speak, of the forces of sympathy, just as there is a concentration of the intellectual activity in attention; in fact, the latter depends in no small degree upon the former. Under this condition, effective teaching is possible. The teacher has an insight into every mind; he adapts every question to its needs and arouses it to normal action, and breathless interest and brightening eye prove that his labor is not in vain.

Personality is a large factor in teaching. Sympathy, we have seen, reveals itself and calls forth the sympathy of pupils, through contact and questioning. The lecturer stands afar off; he may excite admiration, but he cannot create the strong bond of sympathy which is the work of admiration and gratitude which is essential in all true education. But the sympathetic questioner works his way into the hearts of students.

Sympathy, united with enthusiasm, constitutes a powerful personality. More than anything else it is this personality that makes the successful teacher. Learning and method will be of little worth unless there is interest and enthusiasm in the work, for this alone can arouse the interest and stimulate the powers of the student. The fundamental principle is that personality communicates itself, that there is developed in the pupil the same state of intellectual and moral consciousness that marks the teacher. If a subject has no interest for a teacher, it can have no interest for the taught, but sympathy, strengthened by enthusiasm, will make the irksome or even the repellent, attractive.

In the past this association and dental faculties in general have spent much time on the: *What* should the student be taught. Now the tide has changed to, *How* should the student be taught. Lest we should be carried away by the *how*, let us *not* forget the personality of the teacher. No mechanical method can possibly be substituted for this personality. It is the power that insures clearness, force, and permanent effect to all lesson-giving. More than knowledge, it imparts love of knowledge and ability to acquire it.

In the discussion about methods, therefore, it should be remembered that the true method of the educator is not to be found among the scores of ways, plans, devices, methods that are so often enumerated; it is the method of personality. Erudition, knowledge of mind, and normal method have their place,—a high place. But the highest place must be given to personality. The most permanent influence the world has known, or perhaps will know, may be traced to its forming and transforming influence. It operates in the college with far-reaching influence. Too much reliance on methods as methods makes education mechanical, dull, deadening, benumbing, destructive of vitality in both teacher and pupil. This is due to the exaggeration of the mechanical powers of the teacher and its substitution for vital power. Give the student's mind a chance, do not destroy or enfeeble it by spoon-feeding, or putting in its place a machine which you yourself have modeled. Let the student think for himself, and draw his own conclusions.

I wish to thank Professor Hume, of Toronto University, Professor Locke, of Chicago University, and Professor Murray Butler, of Columbia College, for valuable assistance in the study of this subject.

Works read in the study of this subject: "Dewey's Psychology," "Psychology for Teachers," by Morgan; "James's Psychology," "Psychology, Applied to the Art of Teaching," Baldwin; "Applied Psychology," McLellan; "Psychology in Education," Roark; "School Management," Baldwin; "Fitch's Lectures on Teaching," "Spencer's Lectures on Education," "Gaining and Maintaining the Attention," Hughes; "Mistakes in Teaching," Hughes.

THE USE OF TEXT-BOOKS IN CLASS WORK.

BY OTTO ARNOLD, D.D.S., COLUMBUS, OHIO.

(Read before the Institute of Dental Pedagogics, December 29, 1899.)

We have for consideration to-day the subject of books; not, however, under their usual significance as means of information, culture, or recreation, but as technical tools used in our educational institutions.

To the "Century Dictionary" I am indebted for the following definition of the term technics: "Things pertaining or relating to the practice of an art or science." Under this definition books, in an eminent degree, become technical instruments, and their proper use therefore as pertinent a subject of inquiry in this assembly as if they were composed of steel instead of ideas represented by printers' ink.

This taken for granted, I shall proceed to a discussion of the advantages arising from the use of text-books in class work, believing the method to be in accord with the theories of pedagogics which represent the foremost thinkers of the age, and the one which results have shown to be most practical in our best schools.

All colleges unite in placing standard text-books in the hands of their students; the only question at issue is how best to transfer the contents to the brains of their owners.

In the institution which I represent we have adopted the recitation plan in preference to the method generally known as the lecture system, believing that in this way we obtain a more thorough preparation by the student principally through the instrumentality of text-books, lists of which are furnished by the authorities of the school. But just here I wish to put ourselves on record as not depending upon text-books alone, least of all upon any one text-book; that would be to make shipwreck upon the shoals of Scylla after having safely shunned the whirlpools of Charybdis.

"The proper combination of oral teaching and book study," says a noted lecturer on pedagogics, Professor E. E. White, "is one of the profound problems which confronts the teaching profession of to-day." Some strongly advocate one theory, some are firm believers in the other, but on the whole the wiser ones agree that both are absolutely necessary. Goethe's aphorism declares that "thought expands, but lames; action narrows, but intensifies," and we must neither *narrow* nor *lame*.

What, then, are the advantages in the use of books in class work, and what are the best methods for bringing this about? In the first place, the use of books in all instruction is natural and customary to the age in which we live, and to neglect the value of this powerful "fourth estate" would be "worse than a crime; it would be a mistake." In the days of Homer legends and songs were transmitted unchanged for generations, but who on that account regrets the invention of the printing press?

It has been said that if the Bible had been blotted out of existence it might in comparatively modern times have been reproduced from the memories of the devout Scotch Covenanters, but such feats of sound reproduction will never be heard in the dawning twentieth century unless by the aid of the phonograph. *Visual* images are the ones most readily recalled by the majority of people. Sight is sometimes called the regal sense, and Thoreau even said, "Of the five castes, sight is the Brahmin caste." If this is a scientific fact, advantage should be taken of it. Repetition is another factor in impressing details. To a sluggish student, hearing a fact once may not be sufficient to fasten it in his memory, especially as his attention is divided between listening to the argument and jotting down notes for future examinations, while the same student may doggedly pore over his text-book until the meaning becomes clear. Then, if the student misses a lecture it is irrevocably lost under the lecture system, while under the recitation plan it may be partially bridged over by keeping up the connection in the text-book. Yet we do not find, even with this possibility, that absence from class is increased by the recitation plan; on the contrary, its use makes attendance almost obligatory, as unexcused failure to respond means zero upon the record. *Attention,* also, is naturally increased if one wishes to make a reasonable showing before his fellow-students; so, with a gain in *attendance* and *attention,* we claim two powerful factors in favor of our system.

When it comes time for a review the regular manual, with its comprehensive summary, is much more to be depended upon than random notes, often inaccurately taken and poorly preserved.

There is also much more likelihood for preparation when a student is responsible for a certain assigned topic upon which he may be called for discussion, and his actual standing in his class thereupon dependent. Day after day, "no day without a line," he goes on, and at the end of a three or four years' course the whole subject has been passed over. One step at a time seems slow work, but it is the universal law of human progress; and if a pupil has the slightest degree of earnestness his text-books will stand as milestones to mark his advancement, and will form no small part of his practical capital for future use.

But it is evident enough by this time that the main use of the text-book by the pupils is outside the class room, to prepare them to enter intelligently into the discussion of the topics assigned.

"Learning is the result of self-activity," should be blazoned on the walls of every educational institution. Only can the house be built by the teacher when the foundation has been prepared by the pupil himself.

"The recitation plan" is a very flexible title, meaning any and all means of presentation in which the student bears an active part instead of being a passive listener. This may take the form of questions and answers, illustrations, practical demonstrations; even, on occasion, the recitation plan may be set aside for the time being and an extemporaneous or carefully prepared lecture may be given. All this is instruction, and in all cases falls upon the best ground when the subject has been carefully considered by the conscientious use of a text-book to familiarize the learner with technical terms and general principles. In the class room mistaken conceptions are corrected, a thorough revelation of each one's standing disclosed, and delinquents reported before reformation is too late. In short, by this means pupil and teacher come into much closer contact than is possible under any other system.

This brings us to "the other half," the use of the text-book in the hands of the instructor, upon which much of the success of the whole matter depends.

He first makes a careful survey of the whole field, laying it out roughly, according to the number of recitations at his command, eliminating all portions covered by other chairs (for few of us now occupy a whole settee, as did at one time Oliver Wendell Holmes). He will give attention to *proportion* in considering the claims of the remainder for consideration. A good teacher will omit from or insert portions into and rearrange *any* text-book, no matter how excellent, according to his own individuality and the characteristics of his pupils. Then comes the assignment of the lesson, a very important part of the work; to give just as much *and no more* than can be readily digested at one sitting. After this, and still more important, is the daily and specific preparation on the part of the teacher. No one can omit this and keep his own interest, to say nothing of that of his hearers.

The subject must come fresh from his mind, though taught scores of times. In fact, "the barrel" is the greatest stumbling block in the path of the lecture system; a danger not so peculiar to the recitation plan, where every answer tends to sway the current of thought. Then comes the summing up, when the use of the text-book is revealed on the part of both pupil and instructor. The skillful leader will sift out the essentials of a chapter, omitting matters of small importance, comparing, condensing, elaborating, illustrating; *this* is, in short, what we consider using text-books to the best advantage, and one that is growing in favor in all schools that have given the subject the consideration which it demands.

"There has been much discussion," says President Eliot, of Harvard University, "about the comparative merits of lectures and recitations. Both are useful; lectures for inspiration and guidance, recitations for securing and testifying to a thorough mastery on the part of the student of the treatise or author at hand.

"Recitations alone degenerate into dusty repetition, and lectures alone are *a useless expenditure of force. The lecturer pumps into sieves.* The water may be wholesome, *but it runs through.* The discussion about lectures and recitations has brought out some strong opinions about *text-books and their use.* Impatience with text-books and manuals is very natural in both teachers and taught. These books are indeed, for the most part, very imperfect, and stand in constant need of revision. *But it is a rare teacher who is superior to all manuals.* Scientific manuals are, as a rule, much worse than those upon literature, language, or philosophy, *yet the main improvement in medical schools during the last twenty years* has been the addition of systematic *recitations to the lectures which were formerly the principal means of instruction."*

Finally, one important influence which we must not overlook, though an indirect one, is *the habit of using books* as aids in professional study, a habit of tremendous importance in determining the mental status of the graduate in his whole future career.

The art of mastering the printed page, like that of all other arts, depends upon diligent practice; in fact, can be acquired in no other way. Some educators declare that in the present prevalence of oral teaching in the city schools the decrease in the power of book study is readily perceived. If this is the case, there is indeed a loss, and one which we can ill afford to suffer. The man who can lay his hand at will upon his scientific authorities, as a soldier upon his trusted weapon, is armed in advance for many an unexpected emergency which would otherwise result in mortifying defeat. Garfield's famous definition of a university has often been quoted: "Myself at one end of a log and Johns Hopkins at the other end." But may we not also speak a word for the firelit cabin in which Abraham Lincoln graduated, where he and his book were both at the same end of the log?

We have not exhausted the possibilities of the subject assigned us, but enough has been said to indicate what are to us the manifest savings in time and energy in the use of a comprehensive, clearly-written text-book. We do not use this as an oracle or inspiration, but simply as a guide-book, a Badaeker, if you please, to lead us in the general details of our journey and spare us time and needless labor. We may not wish to stop at all the points he indicates, and may linger where he expects us to make only a day's visit, but on the whole we greatly rely on our wise counselor, and gladly put ourselves under his guidance, satisfied that, though the way is long and the journey sometimes wearisome, the direction at least is right.

MECHANICAL ABRASION OF THE TEETH.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the Kansas State Dental Association, at Topeka, Kansas, May 3, 1900.)

THE term *abrasion* must be clearly understood as being distinct from *erosion,* although the two words are often employed interchangeably. The term erosion is properly applied to that form of wasting of the surfaces of the teeth which is due alone to chemical causes, and is characterized by molecular disintegration and solution of the lime-salts of the dental tissues; while abrasion is the term properly applied to the destructive wear of these tissues due to mechanical causes only. The two processes are quite unlike, although the results may sometimes be somewhat similar, as in the wasting of the labial surfaces of the anterior teeth, where it is often difficult to distinguish the one process from the other.

By the term *mechanical abrasion,* or the word *abrasion* only, we therefore mean only the destructive wear and wasting of the tooth-structures from mechanical causes.

Wasting from abrasion occurs, in the first instance, upon the labial and buccal surfaces of the teeth, and is due in this location to the mechanical friction of the tooth-brush when used too vigorously and persistently with a lateral motion to cleanse the teeth, with the addition often of too gritty grades of tooth-powder. This form of wear is familiar to dentists in persons who are in the habit of using the tooth-brush too vigorously across the exposed surfaces of the teeth. The wear is often quite destructive, and results frequently in the cutting of deep notches at the cervical borders of the enamel, where the necks of the teeth are exposed by recession of the gums,—which is also due in a degree to the hard cross-brushing. The notch is often also cut directly into the enamel of the crown. The dentin therein is as smooth as if cut with a file and polished. Sometimes it is sensitive, but not usually so. Erosion sometimes takes this form of wasting in this position, so that the two processes are difficult to distinguish. It is sometimes necessary to prepare and fill these notches before the pulp is reached, although the latter organ usually recedes by dentinification as it is encroached upon.

As to the treatment of this form of abrasion,—after filling, when necessary, the patient should be instructed to employ the *vertical* instead of the lateral motion in brushing,—*i.e.,* from the gums toward the edges of the teeth,—and to use a brush with cross-rows of bristles and a softer and less gritty tooth-powder.

Wear of the entire labial surfaces of the anterior teeth may result from this cause also,—*i.e.,* hard cross-brushing. This type is quite like some forms of erosion. Even the bicuspids and molars may be worn or notched deeply, by the wear of the brush, especially on the left side in right-handed persons. The direction of the brushing motion must be corrected in these cases also. The dentin is usually quite normal in color in these notches except a slight pigmentation in some persons, or in smokers when it becomes stained by deposits of carbon, or when attacked by caries. The worn surface is often quite hard and glassy until caries supervenes to aid the work of destruction. The dentin then becomes quite sensitive, and filling is indicated as being immediately necessary.

Abrasion of the occlusal surfaces of the teeth is quite common, and is due, of course, to the attrition of mastication. This form of wear is even sometimes called erosion, but the term is erroneous as applied to it, for chemical disintegration never takes place on these surfaces. The points of the tubercles of the molars and the cusps of the bicuspids and cuspids are first worn off, exposing the dentin, which wears out in little cups surrounded by a wall of enamel. The edges of the incisors are worn off so as to show a line of dentin between the labial and lingual plates of enamel which gradually widens to a groove. This is the *first degree* of wear, or *primary abrasion,* as it is sometimes called. There is as yet no disturbance of the occlusion for the cusps, and edges are yet long enough to interlock and preserve the normal articulation. Abrasion at this stage is readily interfered with by cutting out and filling the little cup-like depressions, and thereby preventing further wear.

The *second degree* of wear, or *secondary abrasion,* is when the cusps and tubercles are worn off and the occlusal face is quite flat. There are extensive depressions where the dentin is exposed, and elevated ridges of enamel run irregularly over the surface. The abraded dentin is likely to be quite sensitive at this stage, and will require cauterizing with acids or caustics or applications of zinc phosphate cement to allay the sensibility, before the depressions can be filled with gold, which is the proper treatment. The incisors are worn off one-fourth or one-third of their length, and the dentin is destroyed so as to leave a distinct groove across the entire width of the crown. The enamel-wall being left higher, it is readily fractured and presents a ragged and chipped appearance. This groove must, of course, be filled to prevent further wear and chipping. At this stage there is distinct disturbance of the occlusion. With the loss of the natural eminences of the occlusal surfaces of the grinding-teeth and the rim of the overlapping edges of the incisors, the interlocking of the articulation is lost and the jaw glides forward as the teeth are reduced in length. There is a perceptible "jumping of the bite." This is especially noticeable in tobacco-chewers. The treatment consists in the restoration of the masticating surfaces by proper filling and crowning. Effort should be made to correct the occlusion by raising the bite and thereby drawing the jaw backward to its normal position.

In the *third stage,* or *tertiary occlusion,* the entire occlusal face is worn off, the crown is irregularly reduced in height and presents the appearance of a wide concavity with ragged enamel edges around it. There is approach of the wasting to the pulp, with the result of its dentinification and recession, or exposure and death. The latter result frequently occurs when the wear proceeds too rapidly to permit the pulp to protect itself by dentinification. As the teeth approach this stage the wear of the different dental tissues resembles in a degree the irregular wear of the teeth of herbivorous animals where the varying densities of the enamel, dentin, and cementum produce a constantly rough surface for the masticating of resisting vegetable fiber. The upper and lower teeth, when closely interlocked by the irregular wear, form a fine line of contact which also recalls the normal arrangement of the occlusion in the herbivora. The edges of the enamel in the extreme stages of wear are sharp and ragged, and are a constant menace to the tongue and cheeks, which are frequently cut by them and severely wounded. Constant irritation of the tongue from this cause may sometimes, in persons in whom there is a predisposition, cause it to become the seat of cancerous growths. On account of this danger, in persons past middle life, this sharpness of worn teeth must be carefully watched and corrected. The treatment for the extreme stages of occlusal abrasion is to raise the bite to the normal line by means of cap-crowns and bridges, and contouring.

The incisors and cuspids may be worn down until the cervical third, the thick portion of the crown, is reached, and the edge looks wide and grooved. This appearance has led to the popular idea of old persons having "double teeth all around," of which we often hear. The loss of bicuspids and molars contributes to the excessive wear of the anterior teeth by throwing the extra work of mastication upon them. From irregular loss of teeth irregular wear of the remaining teeth often ensues, and produces some curious forms as the result of excessive attrition in a few localities.

The primary cause of abrasion of the teeth upon the occlusal surfaces is, of course, the performance of the proper function of these organs, the reduction of food and its mastication preparatory to digestion. In many lower animals this wear is normal and necessary, and nature provides for its utilization in many remarkable ways. In the herbivora, for instance, the three dental tissues are so arranged that their different densities cause unequal wear and preserve a constantly rough surface, which is necessary to triturate the fiber of vegetable food. For the purpose of causing normal wear of the molars of elephants in captivity, it is said to be necessary to add sand to their food. Again, in the rodents the enamel is very thick upon the labial surface of the incisors and thin or absent behind, so that this portion wears away rapidly, and the harder enamel in front stands up to preserve constantly sharp edges. As these teeth are of continuous growth, excessive wear is necessary to compensate for this growth. Nature thus utilizes the attrition due to use to preserve the normal effectiveness of the teeth in many lower animals, and such teeth are of continuous growth. In man, however, where there is limited growth of the teeth, and therefore no compensation for wear, such wear is permanently destructive.

There is much difference in persons, as they come into the dentist's hands, as to the extent and degree of abrasion of the teeth. In some persons the enamel performs its proper function as a perfect and permanent protection to the dentin, and endures for the lifetime of the individual. In others it wears away with more or less rapidity and exposes the softer tissue, the dentin beneath, which is soon destroyed by the attrition incident to the proper mastication of food. This destructive wear without compensating growth is found in other animals also. This is noticed in old dogs, rats, cats, and other animals in which the teeth are so completely worn out as to become ineffective for the purposes of mastication. In a state of nature starvation undoubtedly ensues to old individuals from this cause. In man, extraneous habits, such as tobacco-chewing, often contribute to destructive wear. This is one of the common causes of abrasion of the occlusal surfaces, the silica in the tobacco leaf acting as a most effective abrading agent. Not only this, but the constant and unusual employment of the teeth assists the wear. There is a peculiar end-to-end occlusion of the teeth in tobacco-chewers that is quite characteristic, for as the tubercles wear off the jaw moves forward, and by the squarer bite contributes to more rapid wear. Cases are known where cessation of wear has followed the discontinuance of the tobacco habit. It is a mistake to suppose that the amount of wear of the teeth bears any relation to the age of the individual, as has been occasionally advanced,—as in horses,—although the rule holds good that the teeth of old persons are much more worn than those of the young.

Among ancient and savage peoples the excessive wear of the teeth is almost universal, and is often quite remarkable. It is almost constant in adult skulls, as an examination of the specimens in museums will show. This is due to the hard, uncooked, or gritty nature of the food employed. The writer has recently examined nearly two thousand skulls in the museums of Philadelphia, and the destructive wear of the teeth in ancient savage races is almost universal. Only in young skulls could the cusp patterns be made out with any degree of certainty. The pulp usually recedes before the encroachment of abrasion, but frequently it is exposed, and its death and alveolar abscess ensue. This disease from this cause is quite common in ancient skulls where the teeth are much worn. Inexpert observers of ancient skulls are disposed to classify the much-abraded teeth as being different from the teeth of other and later races which are not so abraded. For instance, when the incisors and cuspids are worn down to the thick part of the crown near the neck and more or less notched, they are crudely described as being radically different from the teeth of Europeans, and as having "double teeth all around." Many old travelers thus describe the worn teeth of savage people, and even recently a newspaper archeologist writes of the teeth of the ancient Cliff-Dwellers of Colorado as being different from those of later man in being "double teeth all around." Some of the early explorers in Egypt described the teeth of the ancient mummies as being "thick at the edge," and different from those of living races. In the collections above referred to the writer found no ancient skulls with "double teeth all around," but did find that destructive abrasion was almost universal, the anterior teeth being often worn to the base, and showing the round section of the tooth at that point which so often misleads inexpert observers and perpetuates the popular illusion. The mistake is pardonable in the laity, but is inexcusable in anthropologists who have a knowledge of human anatomy and are exact as to the anatomical variations of other parts of the human body.

The cause of this destructive wear is, of course, to be found in the nature of the food employed and the use of the teeth as tools besides, in ancient and savage peoples. For instance, in addition to the silica of the grain of Indian corn, as the Indians grind the corn in stone mortars, like the metates of the Indians of the Southwest, sand from the stone naturally gets mixed with the meal. This, of course, causes much wear of the teeth. Or sand or earth gets mixed with the food at the open camp-fire, of which wild people are very careless. Or plants or nuts are eaten without the preliminary of washing the earth from them. Coarse vegetable food, more or less uncooked, with hard silicious stems causes much wear, as do raw meat, tendons, and even bones, which require much masticating effort. Cooking by means of hot stones thrown into water contributes its quota of grit to the preparation. These and other crude habits in a state of nature caused much abrasion of the teeth of our ancestors and all savage tribes.

The employment of the teeth as tools also causes much destructive wear and fracture. Savage man uses his teeth for seizing, pulling, tearing, cracking, and crushing implements, and for many other purposes which civilized man performs with tools. The Eskimos chew their leather to make it soft, and as they are in the habit of thus softening their boots and other leather clothing every time it gets wet, the demand upon the teeth is excessive and results in destructive wear. In the fine Eskimo skulls in the collection of the Philadelphia Academy of Natural Sciences, the teeth are worn and fractured, and the alveolar process is much thickened by this hard use. Other uses as tools to which the teeth are put by savages are very destructive, aside from mutilations for ornamental purposes.

With advance in civilization the substitution of tools for the use of teeth for many purposes, the cooking and softening of food and the exclusion of its most gritty elements, have gradually eliminated the agents that were most productive of abrasion of the teeth. Tobacco-chewing alone remains to civilized man as a lingering barbarism that is still an active cause of abrasion. A few individuals masticate the food so thoroughly as to produce wear from that cause, and some dentures seem to wear more rapidly than others, but the most wear is found in those who have lost some of the masticating teeth and the extra work of mastication is thus thrown upon the remainder. This can be readily corrected by our mechanical and artistic resources nowadays, so that restoration to normal effectiveness is quite a simple matter.

THE SHADOW PROBLEMS OF PORCELAIN INLAYS.

BY JOSEPH HEAD, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the New York Odontological Society, January 16, 1900.)

To the dentist who practices the art of porcelain inlay work, the shadow variations present a problem so perplexing that unless it be mastered one-half of the porcelain fillings inserted will be too dark, even though the operator may have spent hours in mixing his shades to perfectly match the color of the tooth.

Color variations appear similar to those that confront one who looks on the surface and on the edge of a piece of window-glass; the surface is nearly colorless, while the edge may be dark green.

Shadow variations arise from two principal sources: lack of light and lack of reflection. Thus, in a perfect light, yellow porcelain is yellow because all of the other colors that make up light are absorbed, and only yellow rays are reflected to the eye; and if the light be gradually decreased, fewer yellow rays will be reflected and the color will become darker until the light is entirely gone, when the porcelain will appear black.

These physical phenomena are so simple and well known that apology might seem necessary for dwelling upon them in a scientific meeting were they not, in my opinion, the sole means of explaining the color perplexities that startle and dishearten even the experienced porcelain inlay worker.

The more perfect are the front and side lights in porcelain fillings, the less will be the shadow variations in color.

FIG. 1.

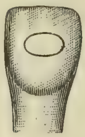


FIG. 2.

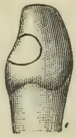
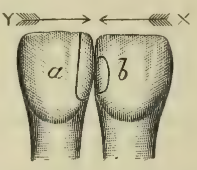


FIG. 3.



Take, for example, a simple labial cavity, as illustrated in Fig. 1. If this extend into the dentin sufficiently deep to prevent the color of the oxyphosphate or any other cement from shining through it, the moderately true color of the porcelain will be obtained, for the direct rays of light will be reflected by the cement directly back into the eye; and if a more transparent cement be used and side light from the tooth-substance be also obtained, a truer color of the porcelain will be given. If, however, we place this same well-matched material on the approximal surface of the tooth, as in Fig. 2, with an adjacent tooth shutting off direct reflection, and allowing only indirect rays to catch the eye of the observer, then the color of the filling will be hopelessly lost in shadow, and the shade, from having been perfect or nearly so, will assume a dull lead color. If, also, in Fig. 1, the labial cavity should penetrate entirely through the tooth, through the palatal enamel, the inlay, instead of being easily matched to the adjacent tooth-structure, would present a problem of almost hopeless difficulty; for almost all of the direct rays would pass through it and be lost in the shadows of the mouth, while the side light would be shut off by the non-transparent cement that stability compels us to use. This difficulty could, of course, be overcome by making two fillings, one on the palatal and one on the labial surface. I speak of the inlay running through the entire tooth-substance only as an illustration of where the greatest amount of color variation will be found; and the more any porcelain inlay approximates this condition, the greater will become the tendency of the color to be lost in shadow. When the inlay is so situated that it can reflect only oblique rays to the eye, a still greater variation of colors becomes manifest. Take, for illustration, the two fillings as shown in Fig. 3. In each instance the fillings go evenly through the labial and palatal walls of the enamel, and yet if both fillings are made of material that matches the tooth-substance, the corner inlay (*a*) will result in a good match, while the half-moon-shaped filling (*b*) will be dark. If, however, *b* does not go through the palatal wall, and the cement extends entirely behind it, its color will be nearly, if not quite, as good as that of the corner, it having assumed almost the classification of the simple labial cavity above referred to. The difference in the shades of these two fillings might be explained as follows: The corner (*a*) is illuminated by side light from the cutting-edge, while the half-moon-shaped filling (*b*) is shut in on four sides, on three by cement and on the fourth by the adjacent tooth. And it will further be noted with the corner (*a*) that if it be looked at directly in front or from the direction of the arrow *x* toward the cement, the color will be good; if, however, it be looked at away from the cement, as indicated by the arrow *y*, the color will be either lighter or darker, according to the intensity of the light, but the true color will not be seen. This is not, however, a serious objection, as the filling is usually seen from directly in front, and the occasional side views are equally divided between good and bad lights. We may, therefore, feel that a corner inlay is favorable to the obtaining of a good match.

Buccal fillings on bicuspids and molars are as easily matched as the simple labial cavities, for they come under the same conditions of light reflection; but all approximal inlays from the posterior surfaces of the cuspids back to the molars show the same falling off in color, and unless allowance be made for this, disheartening results will be the outcome of otherwise careful work.

The more the floor of a cavity slopes inward, the greater will be the shadow variation; the more it slopes outward, the less will be the shadow variation.

Having now stated, somewhat vaguely I confess, a few of the conditions that govern the shadow variations in porcelain work, it may be well, before treating of the remedy, to mention those fillings that are not materially affected by shadow variations and those that are so affected. Those not affected are simple labial and buccal cavities, corners of centrals and laterals, and cusps of cuspids, bicuspids, and molars. Those most affected are tips of centrals and laterals, and approximal and half-moon-shaped cavities running through the palatal enamel. The broader the adjacent teeth, the greater will be the shutting out of light and the consequent darkening of color. Tips of centrals and laterals running entirely across the tooth are so subject to the shadow variations from cross light, side light, top light, and bottom light that the restoration of more than a third of such a tooth is not advisable. When half of a tooth has been carefully matched and cemented into place, the tip in good daylight may look very well, but in a dark shadow it may turn dark. Then in the evening, if the patient laughs and the artificial light shines from above, the tooth and cement line show dark, very dark, and the porcelain seems snow white; and so on until the perplexed operator is reduced to despair. In all such cases, if it be possible, a portion of the tooth should be allowed to run down to the cutting-edge.

And now let us consider how we may partly avoid the evil results of shadow variations. A half-moon-shaped cavity may be filled on the palatal wall with gold and on the labial wall with porcelain, an absolute match being thus made possible. A porcelain tip may be built up as two corners to avoid the terrible side lights. But practically all attempts to antagonize shadow variations will result in an effort to so lighten the fillings that the shadow will be overcome. This lightening is now quite possible, for my experiments have indicated that an addition of one-tenth to one-fifth of the oxid of tin to the ordinary white enamel gives a white so dense and powerful as to be practically the opposite of the shadow. If, therefore, we have a filling half-moon-shaped or approximal, we should first match the porcelain to the tooth as though it were a simple labial cavity, then, by adding to this porcelain one-fourth to one-third of the dense white above referred to, we shall find that the filling, when cemented into position, will darken to the original true color of the tooth; that is to say, if the colors have been properly mixed.

The profession is once more indebted to Mr. George H. Whiteley for giving it an improved set of porcelains for inlay work. In addition to the dense white, so valuable for counteracting shadows, the set contains seven standard shades and a key of formulas for mixing them, so that any of the twenty-five shades found on White's shade ring can readily be obtained. The set also contains, already mixed, ten of the most popular shades, so that an infinite number of combinations is possible. These were made under my supervision. The shades mix with the accuracy of water colors; the color can be burnt out of them through gross carelessness only; while the colorless high-fusing powder, used to prevent contraction in large contours, not only makes adaptation easy, but gives a strength almost equal to porcelain where the biscuit has been subjected to the pressure of a mold.

Before closing I should like to say a word about cements, for in them lurk the shadows that so nullify our endeavors, and in them lies the ultimate success or failure of porcelain inlay work. If we had a strong, durable cement with the refraction equal to that of the tooth and porcelain, we should be able to make perfect inlays, invisible in any light; but such a cement is yet to be found.

There is, however, a transparent cement made of cellulose that seems to be available in labial cavities, where the force of mastication is not felt. It is made by Dr. Doyle, of Atlanta, Georgia. This cement should be carefully painted over the thoroughly dried undercut walls of a labial cavity, and over the dried undercut porcelain inlay. It should be allowed to harden for about five minutes, when the filling may be put into the opening of the cavity and ironed into place with a hot instrument. For a minute or two after the filling has been put into place, a blast of cold air should be directed upon it, and then the rubber dam may be safely removed. The edges may be finished with a fine sand-paper disk at once.

While the cellulose cement is valuable where there is no pressure from mastication, wherever great strength is necessary we have as yet nothing to take the place of oxyphosphates of zinc. Of these oxyphosphates any slow, creamy cement may be used; but up to the present time the Harvard cement—with all its faults, and there are many—has, in my experience, given the best results. Nevertheless, we must not remain satisfied. The Harvard cement has not hydraulic properties. All the hydraulic cements seem either too gummy or too rapid in their setting; but there is hope that a creamy, slow-setting, hydraulic, permanent cement may soon be found; and when such a cement shall have been found, another step will have been taken in the progress of porcelain fillings.

DENTAL JURISPRUDENCE.

BY DELANCEY B. ARMSTRONG, D.D.S., WATERTOWN, N. Y.

(Read before the Union Meeting of the Fifth District Dental Society of the State of New York and the Jefferson County Dental Society, April 11, 1900.)

THE general principles of medical jurisprudence apply equally well to the dental practitioner, but there are certain special questions which arise exclusively in dental practice.

Owing to the advance made in dental science, embracing the discovery of many new operations and methods of treatment, increased responsibilities rest upon the dental surgeon, the neglect of which might involve him in litigation, and the knowledge thereof may at some period in his professional career avert a calamity of a serious nature.

Dental jurisprudence may be defined as the science which teaches every branch of dentistry to the purposes of the law; hence its limitations on the one hand are the requirements of the law, and on the other the whole range of dental knowledge, anatomy, physiology, therapeutics, materia medica, chemistry, operative and prosthetic dentistry, and oral surgery.

When we begin our studentship we look forward with yearning to the time when we shall have acquired sufficient knowledge and experience to be vested with the degree of Doctor of Dental Surgery.

Let us inquire what legal protection is afforded to the dentist by the degree D.D.S. What are the limitations of the practice of dentistry, and what is the legal right of the dentist to administer remedies systemically?

In considering the legal protection afforded to the dentist by the degree D.D.S., two important topics—"the legal right of the dental practitioner to perform any and all operations within the limitations or domain of dentistry," and "the legal right to administer remedies systemically"—are presented for conclusive legal interpretation and discussion.

Legal Limits of the Dental Domain.—In discussing these questions it is of first importance to describe the "limitations of the practice of dentistry," or, in other words, what may properly be considered as included in the professional duties of the dentist. Undoubtedly the care of the teeth when sound, the treatment of their deformities when unsound and unhealthy, and the adaptation of substitutes for them when by age, accident, or disease they are lost. It also includes the extraction and filling of the teeth, and other operations upon them, their alveolar processes, and in some cases upon the adjacent bones; transplantation, replantation, and implantation of the teeth; the treatment of the diseases of the teeth, gums, and antrum, surgically, medicinally, or by both. These latter operations mark the limit which separates dentistry from oral surgery. He must be competent to perform any operation, treat any disease or pathological condition pertaining to the dental organs, and adopt and practice such systemic treatments as are promulgated by the body of the profession.

A prominent dentist erroneously asserted that M.D. is the only degree that can protect the dentist in case of serious results following surgical operations, and that the law will not find him blameless who without this degree essays operations from which evil results follow. This statement is fallacious. That a dentist is licensed to perform any and all operations within the domain of dental surgery there can be no dispute, providing, of course, that he complies with all the laws and enactments regulating the practice of dentistry in the country, state, or county within which he resides. He is expected to render to his patient the best services and treatment which his ability will allow. The law expects and demands that he be possessed of an average amount of skill and knowledge of his profession; if he lacks that, or neglects to use it judiciously in the treatment of a case or in a surgical operation, he is liable for malpractice should serious results follow any operation he may perform.

Like other scientific professions, dentistry is progressive. Its field of operations has become extended within late years, and operations which in former years were not permissible are now perfectly legitimate. So, also, with the medical profession. Many operations are legitimately performed which formerly would not have been countenanced by the law had serious results followed, and had there been a suit at law.

Experimenting with New Methods.—A dentist cannot experiment with his patients to their injury without liability to damages for the same, but a dentist in performing an operation or treating a case may have a new method of treatment or operation suggest itself to him. It may be only a deviation from or improvement upon an old method. However, if he has good reasons, and could prove that it possessed advantages over the old method, he is privileged to practice the same; or when such operations become popular and accepted by the body of the profession as practical and beneficial to mankind, then, and then only, is he, according to the accepted views of the courts, licensed to perform them. In certain operations the circumstances may vary; each case may present novel features, and of course it is not to be expected that every one will be successful. However, the dentist will not be held liable for adverse results if he can prove that he pursued the course of treatment or method of operation advocated by others in cases of the same character, and that he used an ordinary degree of skill and knowledge. He can vary the treatment and method adopted by others if he can give sufficient good reasons for doing so, and prove to the satisfaction of the court that they are founded on good judgment and authority.

Day by day new operations are discovered, legitimized, and added to the science of dentistry. Those that are adopted and adjudged by the body of the profession to be necessary for the benefit and advancement of the health of mankind the dentist is expected to practice, at least this is what the community and his patients expect of him,—viz, that he should give the best services and the benefit of any new discoveries in science. In court the expert testimony, the lawyers, and jury would determine whether such knowledge could be required of one who possessed an average degree of skill and knowledge of his profession, where negligence and lack of this skill and knowledge was the charge against the dentist.

May Dentists Administer Anesthetics?—Some dentists doubt their legal right to administer anesthetics. These views are erroneous, as it is expected of the dentist, where he can mitigate or lessen pain, that he should do so; and, if the operation demands it, he should administer an anesthetic. We find that the skill demanded of him is held to include all the known rules which the experience of the profession has discovered and advocated. He must thoroughly understand all of the practical details of the operation which the court would hold to constitute only ordinary skill. If he can prove that he thoroughly understands the modes of administration of anesthetics, precautions to be observed, etc., he is not liable for adverse results, provided he applied his knowledge to the case at issue.

A prominent dentist has made the following erroneous statement: "If a dentist should administer an anesthetic and the patient should die, what is the result? The physician can give a death certificate, but the dentist cannot." This is absurd. If a patient dies while under the effects of an anesthetic during an operation the physician must notify the coroner, exactly as a dentist would be required to do, and cannot give a death certificate in such cases. If he cannot prove that he used the requisite skill he would be held liable, just as a dentist would be under similar circumstances.

Administration of Internal Remedies.—Some dentists doubt their legal right to treat cases by internal medication. This belief should be corrected. Dentists must prescribe medicines in certain cases, as, for example, in the treatment of carious teeth, or any pathological conditions of the dental organs of a patient in an anemic condition, due to improper food and nourishment. Where is the well-educated dentist who does not recognize the fact that in order to insure success he must prescribe tonics, perhaps a change of diet, and treat his patient constitutionally, producing a tonicity of the general system? In the South the dentists prescribe quinin for the cure of malarial neuralgia. In trigeminal neuralgia, in most cases, relief can only be obtained by constitutional treatment, and in the severe forms of alveolar abscesses internal medication is absolutely necessary.

If it be granted that the dentist is licensed to treat every disease and perform all operations in dentistry, how can he be successful if at the very outset he is handicapped by being prohibited from prescribing such remedies as are beneficial, and which the case indicates and requires? If it be admitted that we are licensed to treat all such cases, where can the responsibility rest if adverse results occur in cases where internal treatments have been used, providing a legitimate course of treatment was pursued in the case?

A dentist should certainly be held responsible for neglect if he does not use internal treatment in cases which positively require it, and where failure can be attributed to this negligence or want of skill and knowledge. Of course, it is not expected that he prescribe remedies unless he is thoroughly conversant with their effects and the proper mode of administering them.

Dental Malpractice Defined.—Dental malpractice may be defined as bad or unskilled practice on the part of a dental surgeon whereby an unskillful operation is performed, the health of the patient injured, or his life destroyed by the improper and careless administration of medicines or anesthetics. In the performance of all dental operations the dentist is required to use at least ordinary skill. He must adopt the means and apply the skill and treatment advocated by the highest and best authorities in his profession. Should the practitioner inform his patient of his lack of skill, or should he learn from other means, the patient cannot complain of that which he knew did not exist.

Again, a dentist is not bound to use the highest degree of skill, but he must use reasonable skill and diligence; and in judging of this, regard must be had to the recent advances and improvements.

A dentist cannot experiment with his patients, and must exercise judgment and care in undertaking to perform a new operation or to use a new instrument. Should injury result from experimentation with new instruments and methods, he can be held liable in damages for the same.

Higher Responsibility of Specialists.—The law recognizes a difference existing between the relative skill and knowledge of a specialist and a non-specialist. A dentist announcing himself to the public as a specialist in any branch of dentistry, whether in bridge or crown operations, diseases of the mouth, administration of nitrous oxid gas, orthodontia, or operative dentistry, is by law supposed and expected to possess more than the ordinary skill or knowledge of the subject required of a general practitioner. He is expected to possess and practically use the highest skill and knowledge his profession has attained on the subject.

Legal Status of Fees.—In regard to services and the compensation for the same, I find that a dentist cannot be compelled to render service to a patient when requested, but when once he has taken a case he must continue his services, unless dismissed, until other attendance can be obtained, even if the services be gratuitous. A dentist has a right to charge for time lost by an unfilled appointment. The decision of the court will depend upon the circumstances and evidence produced. A dentist has the right to retain a set of teeth made or repaired by him, as security for reasonable charges. This lien is waived by parting with possession or agreeing to give credit for them.

Legally, no limit is placed on the fee a dentist may charge for his services. A practitioner may charge more or less, using his discretion, estimating the value of the service which he renders. The value of the services of all professional men is not alike. An eminent practitioner, with an established reputation and long experience, can reasonably demand a larger fee for the same service than a less experienced practitioner.

The variety of circumstances, as the nature of the disease, the amount of knowledge and skill required in the treatment, the circumstances under which the services were given, the difficulties and expense attending them, and the responsibility devolving upon him, regulate the value of the services of a professional man.

I think there is a tendency among dentists to belittle their services, saying to themselves that the fee charged is sufficient, and depriving themselves of the extra remuneration that might be gained if they held a higher estimate of the value of their own work.

In conclusion, I would say that the law affords us greater protection, greater latitude for operations, and greater respect for our work, from a pecuniary standpoint, than is generally supposed, and we ourselves are to blame if dentistry does not always stand as one of the noblest and most respected professions.

THE PHILOSOPHY OF MASTICATION.

BY DR. GEO. B. SNOW, BUFFALO, N. Y.

(Read before the Seventh District Dental Society of the State of New York, April 24, 1900.)

ARTIFICIAL dentures must, in their construction, be regarded from two standpoints, the esthetic and the mechanical. It is not enough that the teeth are of the proper shade and shape to correspond with the age, temperament, and complexion of the patient, but in their arrangement three purposes, entirely different, must be carried out. First, they must be so arranged that they will contribute their share toward giving a pleasant expression to the features. Secondly, they must be so disposed that mastication will be well performed, and all the stability possible must be given to the denture for its efficiency. Thirdly, the production of the sounds necessary for speech must be considered. The first and second of these conditions will depend upon the correct arrangement of the teeth themselves, the third to a great extent upon the correct conformation of the lingual surface of the plate. At the present time attention will be called to the second condition only.

The mobility of the mandible and the variety of its movements are well known. These movements may be divided into three classes, necessary for the performance of three acts, as follows:

Prehension.—The mandible being thrust forward, bringing the cutting-edges of the incisors together, as in biting off a morsel of food.

Attrition.—The mandible being depressed and moved laterally outward, then elevated to bring the opposing teeth in contact, and moved laterally inward to comminute the food between the teeth until the original central position is again attained, when we have,—

Occlusion.—The cusps of one set of teeth being received into the sulci of the opposing set.

The following terms, relating to certain peculiarities in arrangement that are noticeable when a perfect set of natural teeth is examined *in situ,* will also be used in the discussion of this subject:

The lower incisors are much narrower than the upper ones, and are set upon a smaller circle, their cutting-edges falling behind those of the upper incisors, and usually passing upward, so that the opposing teeth overlap one another to a greater or less extent. This condition is known as the "overbite." In some instances it is not present, the teeth meeting edge to edge. In other cases it is excessive, the lower incisors touching the gum behind the upper ones. A certain amount of it is desirable, and for the purposes of this paper a normal overbite may be defined to be such an amount of overlapping of the lower incisors by the upper that the teeth may act, in prehension, after the manner of shears. If the teeth meet edge to edge, they then resemble nippers in action, and are not so efficient in use.

As a consequence of the narrowing of the lower incisors, all the lower teeth are situated in advance of the upper ones, and the center of each bicuspid is in line with the interspace of the opposing teeth, its mesial and distal articulating surfaces meeting the distal and mesial surfaces of its two opponents. This is called the "interlocking of the bicuspids."

A lateral view of either an upper or a lower jaw, with its teeth in position, will show their occluding surfaces not in a plane, but a curve; convex for the upper jaw, concave for the lower. On account of the "overbite," there is more concavity to the lower articulating surface than there is of convexity to the upper. The front of this curve is nearly horizontal, but that part of it corresponding to the molars has usually a very decided upward turn, which has received the name of the "compensating curve." The reason for its existence is better understood after studying the peculiarities of the temporo-mandibular articulation.

In each of these joints, it will be remembered, there are two synovial sacs, separated by an interarticular cartilage, the lower sac being used for the ginglymoid or hinge-like movement of the mandible, the upper sac when it is either protruded or moved laterally. In the latter case the cartilage moves, with the condyle, forward and downward over the eminentiæ articulares; the amount of descent varying with the depth of the glenoid fossæ and consequent prominence of the eminentiæ. These are said to depend, again, upon the length of the cusps of the teeth, and the amount of overbite, the glenoid fossæ being quite deep when there are long cusps, long overbite, and slight lateral movement of the mandible, and shallower when the cusps are flat, the incisors meeting edge to edge, with the lateral movements of the mandible free and unobstructed.

In the movement of prehension the mandible moves diagonally forward and downward, its motion in front being governed by the sliding of the cusps of the bicuspids over one another, and in the rear by the movement of the condyles upon the eminentiæ articulares. If the articulating surfaces of the molars formed a level surface they would be separated by this movement, but by means of the compensating curve they remain in contact. And if the amount of overbite is not excessive, the incisors and second molars may touch their opponents simultaneously in the act of prehension.

In the movement of attrition the condyle on the side toward which the mandible is thrown remains in its fossa, having only a slight movement; partially rotary, partially ginglymoid. The other condyle slides forward and downward, with much the same movement as in the act of prehension. And by means of the compensating curve, contact of the teeth on both sides of the jaws is possible as they come together in mastication.

In the movements of attrition the lower teeth have rather peculiar movements. Taking into account the lateral swing of the mandible alone, these movements are circular, but they are made from two centers, the condyles. The lateral movements of the incisors are thus not in a straight line, but outward and forward from the center on either side, in curves, as one or the other of the condyles forms the center. With the bicuspids or molars the movements of the lower teeth upon the upper are almost directly across the line of the alveolar arch on that side, the condyle of which is serving as the center of motion. But at the other side the movement is forward and inward, and nearly on a line with the arch. Mastication is performed much more efficiently upon the side where the opposing teeth move crosswise, and we find that if a morsel of food is on the right side of the mouth, for instance, the mandible in the act of chewing it is instinctively depressed, thrown to the right, brought up against the morsel, and then returned to the position of occlusion.

When the teeth are in occlusion the cusps of the lower bicuspids and molars are received into the sulci of their opponents, and the buccal cusps of the upper teeth are out of contact, as they overhang the lower teeth. In the act of attrition the cusps penetrate the food and touch as the teeth are brought together, and the space between the sulci of the opposing teeth is filled with food, which is almost entirely cut off from the surrounding mass. Then, as the returning lateral movement brings the teeth into occlusion, that which is imprisoned between the sulci is ground into a pulp. If the grinding-surfaces of the teeth are flat and smooth, they are thereby rendered much less efficient in mastication.

To obtain the best results in the construction of artificial dentures the points discussed should be well understood, and the arrangement of the teeth should be such as to comply with the conditions and obtain the results hereinbefore mentioned. Certain limitations are imposed by reason of the instability of artificial dentures, the principal one being the amount of overbite which is allowable. In nature, the teeth being firmly set in the jaws, the overbite is often so great that when the teeth are in the position of prehension there is no contact except with the incisors. This condition of things, with artificial dentures, would inevitably cause their dislodgment. And this will occur, even with a very limited amount of overbite, if the use of the compensating curve is disregarded and the articulating surface of the denture made flat; and, most of all, if sufficient clearance is not allowed between the upper and lower incisors and cuspids.

It must be remembered that in what may be termed a normal denture the compensating curve and overbite are proportional to the length of the cusps of the bicuspids. In dentures of the nervous temperament, for example, we will find long, thin cusps, a corresponding amount of overbite, and also of the compensating curve. In those of the lymphatic temperament, to go to the other extreme, the cusps are short, and there is less overbite and a flatter articulating surface. But with artificial teeth the shape and length of the cusps is not always, nor, indeed, often, a very close copy of those of the natural organs, and they are usually so short and fit together so poorly that but little compensating curve is necessary or advisable. Still, a certain amount of it is a necessity.

A manufacturer of artificial teeth was lately asked the question, if in designing his tooth-molds any attention was paid to the manner in which the cusps of upper and lower bicuspids and molars would come together, or whether a certain lower set was designed with reference to its being used with and producing correct occlusion with a certain upper set. It appeared, from his answer, that little or no attention was paid to this matter. The upper and lower sets were matched up by an employe who knew or cared little about the articulation of the teeth, and only looked to the appearance of the sets when mounted upon wax cards.

The late Dr. Bonwill recognized this fact, and when setting up artificial teeth he always ground the cusps to obtain the articulation he wished. Indeed, it is said that he always made a point of grinding them enough, at least, to remove the smooth, glassy surface, averring that the roughness left by grinding made them more efficient for mastication. On the contrary, many dentists seem to attach a sacredness to the cusps of artificial teeth, and never touch them with the wheel unless actually compelled to. From what has been said of the way in which they are made it will be seen that this position is absurd, and that if anything can be gained for the efficiency of the denture by grinding the cusps of the teeth it were better to do it.

In the arrangement of artificial teeth the first consideration is, of course, the esthetic effect. They must be of the right size and shade, and of the proper shape; and in arranging them it is well to set up the upper incisors, cuspids, and bicuspids, and try them in the mouth of the patient, to insure their being in harmony with the play of the features. Then the lower second bicuspids are placed in position, central with the interspace between the upper bicuspids. Next the lower first bicuspids are added, followed by the lower molars. The upper molars are then placed, pair by pair, and as each addition is made assurance must be had that it does not interfere with the proper articulation of the teeth already in place; and each tooth as it is added is shifted in position and inclination until the right effect is produced. The cuspids and incisors may be added at any time after the bicuspids, keeping them out of the way so that nothing will interfere with the proper contact of the cusps as the mandible performs its various movements. With the correct arrangement there will be contact at both sides of the mouth with any movement of the mandible, whether forward or lateral, and when this result is attained the greatest possible stability will have been given to the denture, so far as the articulation of the teeth is concerned.

ORTHOPEDIC TECHNICS.

BY C. S. CASE, M.D., D.D.S., CHICAGO, ILL.

(Read before the Institute of Dental Pedagogics, December 28, 1899.)

In accepting the invitation to present at this meeting a syllabus for the teaching of technics in orthodontia, permit me to say at the outset that I do so with no ambition to exploit personal ideas or advocate any one man's system of practice, but rather with the hope that we may unite in our efforts to upbuild this department and make it a worthy branch of a noble profession.

To accomplish this most effectually it is important that we unite upon some common ground of understanding as to its importance, its possibilities, and its needs. With this as a foundation it will not be difficult to construct a syllabus that will be mutually acceptable and advantageous to all who desire that this branch shall be taught in the most practical and sufficiently thorough manner.

Whatever the seeming differences in *modus operandi* among advanced teachers of orthopedic dentistry, I believe the general trend is toward scientific principles and practice, with the gradual elimination of methods that have encumbered the advancement of this department in the past.

I believe it is quite generally accepted and taught that teeth can be slowly and safely moved under limited conditions of age and healthfulness to relatively new and permanent positions, and that such movement is susceptible of being accomplished exactly in accord with mechanical application of force and in keeping with its action when applied to other things in mechanics. Further, that force can be so applied to the teeth under favoring conditions that the roots and adjoining alveolar process will be carried bodily in the direction of its movement, even to influencing to a limited extent the development and future shape of the maxillæ.

Moreover, I believe the statement will not be controverted that the esthetic phase of the operation of dental regulation is, with rare exceptions, by far the most important part of the undertaking; and that this beautifying effect is not confined to the appearance of the teeth alone when exposed, but may be made to extend its influence to all that area of the physiognomy which is dependent for its contour upon the teeth and bones that are susceptible of being changed in their relative positions and shape by orthopedic processes.

These facts, with their broadening influence, increasing the field of our accomplishments and future possibilities in this department, bring us as teachers properly to the consideration of the question, Has the science of regulating teeth attained a stable position of sufficient importance to the profession of dentistry to induce this body to co-operate in teaching it as other branches of dentistry are taught, with a thoroughness in every detail that conserves to the highest accomplishments of the art?

In attempting to give in detail the course which I endeavor to teach in the purely technic branch of this department, I fear I shall encounter many objectors to its extent, etc., who believe that the difficulties to be encountered in what they are pleased to term the simple regulation of teeth do not warrant the occupation of so much time for training students in the mechanical construction of implements, stock material, and appliances, which can as well be purchased, etc.; while others will claim that I go into the work too deeply, or pursue a course which students cannot successfully follow,—that there are other ways much more simple, etc.

I know one dentist who accomplishes pleasing results in the regulation of teeth with silk ligatures alone; another with thin ribbons of pure gold; others with rubber plates, etc.; but that does not deter me from believing their accomplishments are quite limited when compared to those of more thorough methods, founded upon scientific principles.

In my opinion there is no royal road to the highest success in this or any other department of dentistry. And, while I do not assume that we have more than begun to approach the highest success of this department, or that I am more successful in my efforts than others who with me are earnestly striving for its greatest attainments, and whose methods may differ decidedly from mine, I can but strive for the teaching of those principles which experience has taught me will accomplish the results aimed at in the most perfect and efficient manner.

My practice and teaching in the technic branch of the work is founded upon the principle of applying force, almost exclusively, through the medium of attachments soldered to bands fitted and cemented to the crowns of teeth.

While there are many other ways by which the most satisfactory results have been attained, and which I am not here to criticise, I believe there is no other way that will afford the same opportunities for applying force for the movement of a tooth, on the one hand, in every conceivable direction, and on the other for the non-movement of teeth grasped by stationary anchorages and retaining appliances, to say nothing of many other advantages which it and the system dependent upon it affords.

The reason I here lay so much stress upon the band is because upon it, in its completest sense, depends the very character of principles I attempt to teach, which is no man's specialized system, to be followed by rote, but in my opinion a foundation almost limitless in its possibilities for the development of individual ingenuity, —that keynote to successful practice in this department. While the principle of banding teeth is not new, I contend that it is not commonly taught or practiced in a manner to obtain its fullest usefulness.

I therefore feel called upon to make a plea for the band to start with, with the hope that we may agree upon this as a common ground to shape the character of our orthopedic technics. In the same way that you as a body of teachers, after deciding upon gold as the only filling-material for certain cavities, because you see in it certain results that cannot be attained in a like degree with anything else, you proceed in your methods of teaching to thoroughly develop every principle in consonance with its use,—principles, moreover, that have originated through the medium of its possibilities.

I do not mean by "bands" any thin, narrow ribbon or bands of variable quality and adaptability that may be cemented to the crowns of the teeth. And certainly not those that are looped around and uncemented to one or more teeth, nor those that are supplied with attachments, however ingenious, intended for the purpose of avoiding proper fitting and soldering, those saddest of commentaries upon the inability of dentists to perform one of the simplest operations; but I mean bands that possess the special qualifications—properties, thickness, width, position, etc.—to meet the demands of the particular force that is to be applied.

I have found no other material that combines so many of the desirable properties as high-grade German silver for every part of a dental regulating apparatus, with an occasional exception. German silver, as you know, is an alloy of copper and zinc, or brass, with the addition of nickel. Some manufacturers add a small percentage of aluminum and iron.

It is difficult, if not impossible, to obtain German silver from a dealer that is fit for immediate use in the construction of a regulating appliance. Manufacturers do not supply to the trade German silver wire above eighteen per cent. (which means eighteen per cent. nickel) except for specially large orders.

In my experimentation I have found the twenty-five per cent. grade far superior in every way to the eighteen per cent. Besides its natural properties of flexibility, ductility, strength, etc., the higher grade is especially susceptible under proper manipulation of being made exceedingly rigid, a desirable property for jack and traction bars. With further drawing it is nearly as resilient as tempered steel, a property necessary for rotating and alignment wires, spring expanders, contractors, etc. Again, it can be made sufficiently soft and pliable to permit the most accurate adaptation.

Its high fusibility permits the use of any of the gold or silver solders. Its deleterious influences as a metal in the mouth, for the short time it is worn, are no greater than gold. The danger in this particular lies far more in loose methods of construction and attachment of the apparatus, preventing the dislodgment of decomposing detritus. Its appearance when compared to gold is a real objection, but even this is largely obviated by electro-plating, followed by perfect cleanliness in the mouth. Its cheapness is greatly in its favor, permitting, in infirmary practice, the lavish use and destruction of material for every appliance desirable, at a very small fee.

Even in private practice the influence of its cheapness is toward the employment of more original and scientific methods. There will not be the same tendency to use certain stock material or parts of apparatus that you happen to have on hand with a very questionable endeavor to make them do, as you might if they were gold. Nor will you hesitate to cut away and remove apparatus or parts the action of which is found to be inadequate or not as anticipated, or that which the progress of the case has outgrown, with the view of substituting others better calculated to meet the demands.

Before taking up the technic work in detail I wish to speak of some of the difficulties we have encountered heretofore, especially in the teaching of this branch, and to suggest remedies.

We have always experienced difficulties in obtaining proper draw-plates and screw-plates that would enable students to draw wire to the several sizes desired, and to the exact diameters requisite for cutting full and perfect threads with a Martin screw-plate. The reason for this is that there is at present no exact standard of uniformity in the sizes of the holes of different draw-plates marked with the same letter, nor is there a harmonious relation in the graduation of the holes.

Draw-plates being made to merely reduce the sizes of wire within the range of their several fields of capacity, there is also no relation whatever between the sizes of its holes and the sizes of wire required for perfect threading in any of the screw-plates. This is true also of any of the standard gauge sizes.

Students in drawing wire through an ordinary draw-plate frequently find that when drawn through one hole it is too large, and if drawn through the next in size it is too small. This demands the enlargement of the smaller hole with emery strips; in fact, the readjustment of a number of holes in the draw-plate to the required sizes of the screw-plate in use.

Again, when drawing wire, on approaching the particular size required, students are obliged to have frequent recourse to a micrometer caliper, as the standard slot gauges, as I have said, do not measure the sizes required by the Martin or any screw-plate. As the caliper is an expensive instrument, the one owned by the demonstrator or the college has to do for the whole class, a fact that often occasions considerable delay in large classes.

Again, in making tubing with the ordinary draw-plates it is necessary to have an extra draw-plate with holes much larger in size, in order to obtain the use of the two or three large holes required to turn and approximate the joints previous to reducing the tubes in the regular graduated holes.

Several years ago I originated the idea of inserting in one end of the regular draw-plates three extra holes for this purpose, since which time these have been in market and have subserved a good purpose, but they are far from perfect in this and other particulars.

In the Martin screw-plate we have fortunately found a standard of sizes; that is, screw-cutting holes of any number are intended by the manufacturer to be exactly the same size in every plate of the same letter, regardless of differences in other particulars. I have found, however, that different batches of screw-plates will often differ in this particular, so much that a nut threaded with a tap made in one plate is unfit to use on a wire threaded in another.

When it is remembered that the height of a thread on the smaller screws is but .003 of an inch, you can appreciate the difficulty of preventing the slight difference that would cause a misfit, especially when you also remember that .003 of an inch, or No. 40 B. & S. gauge, is the thickness of thin writing paper. Nor is this difference material when the tap for threading the nut and the wire upon which it is to be screwed is cut, as it should be, in the same screw-plate. It, however, explains a common trouble which dentists experience who are forced to depend upon store taps or nuts that have been made by the use of a different plate than the one they use to thread their wires, and it is also one of the many arguments in favor of technic training.

Another difficulty arises in the frequent breaking of the steel taps while they are being threaded, especially by beginners. This is due largely to the fact that with a screw-plate even so perfect as the Martin the complete thread must be cut practically in one hole, because the two holes under one number in any of the present screw-plates are nearly or quite the same size; the difference, being so slight, is of no practical advantage.

The operation of cutting a complete thread at once requires something more than the greatest care to prevent the necessary strain from breaking the steel shanks of the smaller taps. This is also true of the smaller regulating wires when they are drawn to a hard temper and sufficiently large for a full thread. It may be suggested that we begin the cutting in some of the larger holes, and the thread thus partially cut could be safely completed in the required one. In fact, a very good teacher once told me that he so instructed his class. He was probably not aware that holes of different numbers differ in the number of threads per inch, as well as in size. Consequently it is not correct practice to start to thread a screw in the No. 4 hole, for instance, that is intended to be finished in the No. 7, for obvious reasons.

All these difficulties which I have enumerated in the use of the present draw- and screw-plates we now hope to completely obviate by the use of new plates at present in course of manufacture, which will be specially constructed to meet the needs of this particular department.

The new "dental gauge draw-plate" (see Fig. 1) will contain all and only the draw-holes we require. Moreover, they will be cut as regards size to strike an unbroken series of standard American (B. & S.) gauge sizes, and the official numbers of the same will be stamped adjoining their respective holes. Intervening gradation holes between these sizes will be unnumbered. Wire being drawn with this plate will not require a gauge to determine its size. The plate will also possess the three extra holes for starting tubing. These will be regularly constructed draw-holes, in size Nos. 5, 6, and 7. The graduated draw-hole series will commence at No. 8 and end at No. 24. These plates are also intended to contain five ovoid flattened D holes for drawing hook and reinforcement wires, which will be of far more practical shape than the ordinary D wires.

The new "dental screw- and gauge-plate" (see Fig. 2) will have along its edges a broken series of standard American (B. & S.) gauge slots for measuring only those sizes we require of wire, plate, and banding material. The official numbers of the sizes will be stamped in the plate adjoining their respective slots.

As a special feature of the plate, the screw-cutting holes will be specially constructed for perfectly threading the standard American gauge sizes of wire which we need for the work. Each pair of holes for making one screw will be placed on a line with and under the number of the gauge slot, which measures the wire they are intended to thread. Of these holes one will cut no more than two-thirds of a complete thread; the other will finish it, a feature which we hope will effectually prevent the future breaking of taps and small wires.

One of the many advantages of this system, which reduces all our sizes to a single standard, is that we will avoid the confusing necessity of designating these sizes in our teaching; at one time according to B. & S. gauge, at another according to the number of hole in the Martin screw-plate, and again in the thousandth of an inch.

When once established, all sizes of wire, tubing, nuts, screws, plate, and banding material will be designated by the simple use of name and number.

I have thus fully described these plates and their comparative advantages; not alone because I believe they will mark an era in the advancement of orthopedic technics, but more especially to simplify my description of the laboratory work which will be founded upon their use.

By referring to Fig. 2, which represents a face view of the "screw- and gauge-plate," the eight gauge slots on the right, with their respective numbers from 13 to 23, inclusive, designate all the special sizes of wire used for regulating, and which the adjoining screw-cutting holes are designed to thread; while the eleven gauge slots on the left of the plate, with their respective numbers from 24 to 40, inclusive, designate all the different thicknesses of plate and banding material.

FIG. 1.

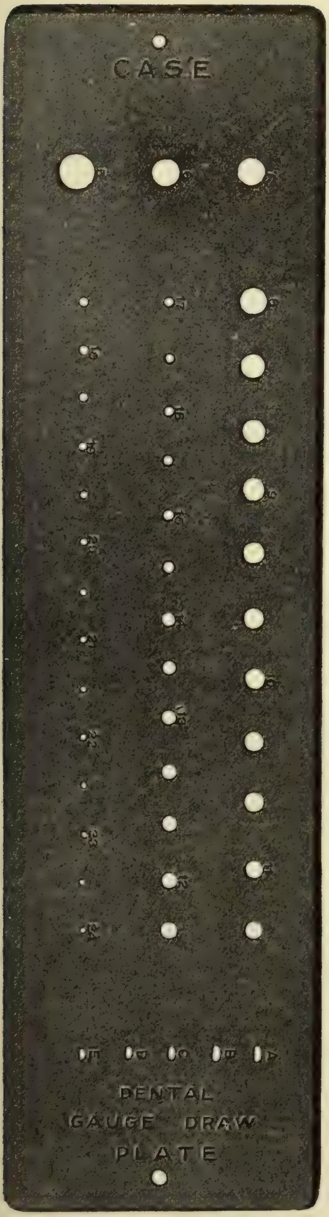


FIG. 2.

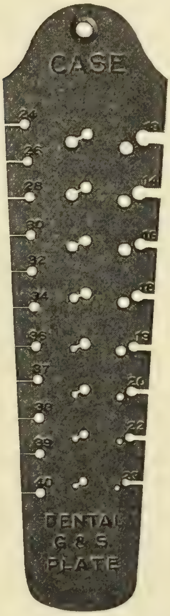
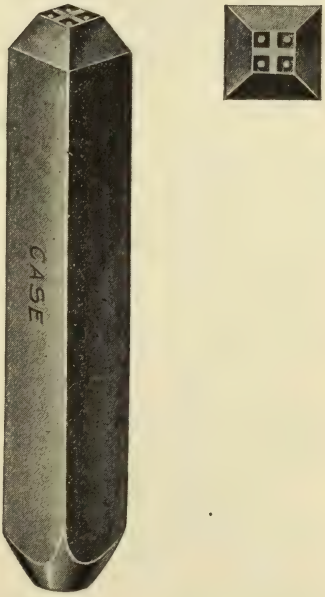


FIG. 3.



In presenting a syllabus for the teaching of orthopedic technics I can do no better than describe in detail the course pursued at the Chicago College of Dental Surgery, which is similar, with slight variations, to that at the Western Reserve Dental College.

The course is confined to the first four months of the junior year, and occupies two half-days of each week.

It consists in the construction of implements for technic use, stock material, and technic regulating apparatuses.

The implements and stock material, when finished, are neatly mounted on cards of uniform size, furnished by the college, and marked with the name of student and number of section, to be turned in for grading.

This material is intended to be distributed to tabulated boxes, containing "college regulating stock material," and ultimately to be used for practical cases by the seniors. We have found this feature of the greatest importance in obviating the difficulty of obtaining and having in college stock proper regulating material.

The technic regulating apparatus of the course consists in the construction of one of sixteen standard regulating apparatuses, which are intended to cover all the ordinary demands for the regulation of teeth. Large working drawings of each of these are framed and hung in the laboratory. Students are also furnished with blue prints drawn on a smaller scale.

The apparatus, when finished, is gold-plated and mounted, with perfect plaster models, upper, lower, and occlusal, in a specially prepared box furnished by the college, and marked with name and section ready for grading. This box with its contents is returned to the student at the close of the senior year.

Before beginning the work the class is divided in alphabetical order into sixteen sections, or according to the number of technic regulating apparatuses they are to construct. Each student then knows at once what apparatus he will be required to make by comparing the number of his section to those of the working drawings.

Beneath each drawing will be found the name of the apparatus or the character of the irregularity it is intended to correct; also the sizes of all the material to be used, and special directions relative to its construction not shown by the drawing, though, as may be seen, it gives several views of parts difficult to understand.

The present drawings, as shown by the blue prints here presented, will be replaced in the coming year with others more systematically arranged, and bearing designations according to the new system of sizes.

As it would be too much to expect every student to make all the stock material required, it is divided among the sections in proportion to the needs of instruction and the probable demands in practical senior work.

I show you a laboratory chart with stock material attached, which designates the requirements of each section. From this it will be seen that, besides the technic apparatus of the section, each student is required to make one drill, one tap, and one wrench; two rotating wires, five inches long, Nos. 22 and 23, each carrying four inches rotating tubing to fit; two D wires five inches long; one No. 16 jack-screw, with tube and nut; one No. 18 traction screw, with tube and nut; one No. 18 reciprocating jack and traction screw; two prepared rotating wires, ready for adjustment; three prepared hooks, different styles; one roll waxed separating tape.

In connection with the above, Section 1 makes four five-inch pieces No. 13 wire, threaded one-half inch at one end, each piece bearing two nuts, and four inches of tubing to loosely fit; also two rolls banding material, two widths, No. 40.

Section 2 makes No. 14 wire, tubing, and nuts; otherwise same as above.

Sections 3 and 4, No. 16 wire, etc., and No. 39 banding material, as above.

Sections 5 and 6, No. 18 wire, etc., and No. 39 banding material.

Sections 7, 8, and 9, No. 19 wire, etc., and No. 38 banding material.

Sections 10, 11, and 12, No. 20 wire, etc., and No. 38 banding material.

Sections 13, 14, 15, and 16, No. 22 wire, etc., and No. 36 banding material, excepting that Section 16 makes No. 34 banding material.

All wires used for constructing regulating appliances are drawn *without annealing* from "hard" German silver wire, No. 9, the object being to obtain wires of a temper that will best subserve the objects of its uses, and exactly the right size to permit the cutting of a full and perfect thread in the screw-plates; two objects that cannot at present be attained by wires purchased of dealers.

The No. 9 wire is issued to the students in pieces sufficiently long for the requirements of each. These are tapered at one end to enter the draw-holes and be grasped by the draw-tongs. The force required to draw these large wires is so great that it is necessary to use an apparatus similar to a jeweler's draw-bench, rigged with windlass and crank.

The drawing of German silver wire adds greatly to its rigidity and resiliency. When hard No. 9 is reduced to Nos. 13 and 14, perfect material is produced from which contouring power-bows can be constructed that possess all the requisite properties. When further reduced and hardened we obtain at Nos. 16 and 18 the requisite properties for jack and traction screw bars. At Nos. 19, 20, and 22 traction and alignment wires, and No. 23 the smallest rotating wire.

The rigidity and strength of these very small wires drawn in this way, and the force which they exert when properly adjusted, cannot be fully appreciated till tested.

When the technic wire is drawn and its size tested in the slot of the screw and gauge plate, it is cut into four pieces five inches long, one end of which is then threaded one-half inch, and the extreme point abruptly tapered ready for the nut and final mounting.

The tubing is made of German silver plate, No. 28, excepting the rotating tubing, which is made of banding material, No. 37. The plate is cut into strips three-eighths of an inch wide and eighteen inches long, one piece being considered sufficient for the requirements of each student. The strip is first thoroughly annealed, then partially turned by laying it over a groove cut in a hard piece of wood, driving it down by the aid of a steel rod laid lengthwise upon it. One end is slightly tapered and solidly rolled to a grasping point by lapping the surfaces. Then it is drawn to loosely fit the particular size of wire for which it is intended, as has been fully described.

The rotating tubing is drawn to exactly fit the rotating wires. When drawn, the tubing is cut in four pieces four inches long, and slipped on their respective wires.

The difficulties attending the proper construction of nuts have, more than anything else, proven a great stumbling block to the teaching of this system of orthopedic technics. This has been partly due to the lack of trained and skilled demonstrators and the persistent teaching of roundabout and cumbersome methods to avoid difficulties, which, let us hope, will soon fade away under a more practical and systematized régime.

The steel for taps and wrenches is partially prepared by the manufacturer at a cost of about forty cents a dozen. The taps are made from engine-bur steel, cut into pieces two inches long, and lathe-turned at one end to perfectly parallel shanks five-eighths of an inch long, the exact sizes required for the several taps. At the other end a short shank one-sixteenth of an inch long, with abrupt shoulder, is turned the same size, to be ultimately threaded for finishing the nut. The student threads the tap one-half the length of the shank and files the end to a three-cornered taper, the facets of which extend one-half the length of the threaded portion. Then it is ready for tempering, which I need not here describe.

These instruments in use are held in a pin-vise.

This year we have commenced using with much satisfaction jewelers' twist drills, that are carefully selected as regards size, at a cost of about forty cents a dozen. In use they are held in a lathe chuck.

The wrenches are made of 5-32 octagon steel, cut six inches long, and dressed. These are made by the students into double-end wrenches of a standard pattern, which I have found to be most useful. One-eighth of an inch at each end is forged to an angle of forty-five degrees, and further flattened and tapered with a file to form the grasps. The slots are then cut with a flat parallel file to accurately fit two of the three sizes of nuts. They are aided in the fitting process by short pieces of square wire that have been drawn through a square-hole draw-plate to the proper sizes.

Up to the present time we have made the nuts from nickel five-cent pieces, in the manner described in former papers.

I now take pleasure in introducing a method which will greatly facilitate this work. It consists in partly stamping the nuts with steel dies. (See Fig. 3.) The dies can be made to stamp four nuts. A greater number has been found to be not advisable on account of the great force required in the stamping process. By examining the die with the nuts in progressive stages of construction, which I here present, it will be seen that the centers are deeply punched for drilling and tapping, and the walls accurately cut the proper sizes required, about one-half the thickness of the nut. The final sawing and finishing to these prepared surfaces will not be difficult. Among the important advantages of this method the nuts will be uniform in the sizes required, and with walls that are uniform in their distance from the threaded hole.

The work has been greatly simplified and systematized by insisting that the grasps of wrenches and the external sizes of nuts shall be accurately cut to three standard sizes, large, medium, and small. The large for Nos. 13 and 14, contouring bars; medium for Nos. 16 and 18, jacks and traction bars, and small for Nos. 19, 20, and 22, traction and alignment wires.

Nuts should contain no more body in the thickness of their walls than is necessary for strength. They should be slightly tapering, as an aid to grasping, and the free ends and corners rounded to prevent irritating projections.

The proper construction of banding material is one of the most important factors in regulating. It should possess the highest degree of pliability that is possible for German silver, in order that it may be drawn tightly round the teeth in measuring for the joint, and finally for the perfect adaptation of the band after it is soldered. This can only be accomplished by thorough and repeated annealings during the process of rolling, and then after it has been brought to the required thickness it should be coiled into rolls and held at a red heat for one hour. The latter requirement may be accomplished by placing a large number of the rolls over a jacketed gas-burner, with intervening layers of plate or sieve wire to protect them from the direct action of the flame. Or they may be placed in the muffle of an automatic gas furnace.

Banding material is made of German silver wires, Nos. 9 and 13, which are both rolled to Nos. 34, 36, 38, 39, and 40, giving us two widths of each number. The requirement for each student is two widths, each two and a half feet long, of the size assigned to the section. The two sizes of wires are cut the required lengths for four students who work in teams to one gauge number. One and a half feet of No. 9 wire will roll to twelve feet No. 34 banding material, and one foot will roll to twelve feet No. 40. Two feet No. 13 wire will roll to twelve feet No. 34, and one and one-quarter feet to twelve feet No. 40.

These results are not unvarying, but will, I think, give a generous three feet of banding material of both widths to each student with which to fill their technic stock requirement, and allow for the technic regulating apparatus.

The waxed separating tape is prepared from German flax tape, which costs about twenty-five cents per gross. We obtain it in three widths, three-thirty-seconds, five-thirty-seconds, and one-quarter inch, the latter to be used double for wide separations. The skeins are rolled to hard coils, using a match for a starter and twirling handle; then they are dipped into boiling white wax.

A PLEA FOR A UNIFORM STANDARD OF FEES FOR PROFESSIONAL WORK.

BY DR. HERBERT L. WHEELER, WORCESTER, MASS.

(Read before the Central District Dental Society of Massachusetts, January, 1900.)

MR. CHAIRMAN AND GENTLEMEN: In thinking over the matter of professional fees, the thought has occurred to me, Is there not some general basis of charging for certain of our work that we as specialists may adopt? No one realizes more fully than I that there are many operations in ours, as in all branches of the healing art, that the operator only can properly judge as to the time required, or appreciate the skill and knowledge necessary to their performance; and for such as these the physician or the surgeon, either general or dental, must be the judge as to what is a righteous compensation. The members of the medical profession in nearly all localities have a regular charge for office calls or for attendance at a private house, and this certainly is one of the things that has had much to do in placing them on that higher level of the professional life, whose labor is of love for their profession as much as for the almighty dollar which we are all desirous of attaining. The regular basis of charges leaves the matter of skill, ability, and trustworthiness the only question to be decided in the mind of the public, and with us some arrangement of this kind would certainly put a quietus on the stamp of practitioner who is forever begging for patients on the ground that he is less expensive than some other brother in the profession; and we all know that his name is legion among us. With a physician the charge is not so much per prescription or so much per ounce of fluid or number of pills, or per number of doses required, but a fair recompense for all-around professional knowledge and skill, which includes examination and diagnosis, as well as advice. It is perfectly plain that the dentist cannot charge so much per office visit, as after examination and diagnosis it is often necessary to keep the patient for several hours in the chair, to the exclusion of service to any other person during that time. We cannot charge so much per filling, even when the same material is used, for no two cavities are precisely the same in every detail; consequently, they seldom require the same skill, nor call for the same expenditure of time. This also holds true to a very large extent in the domain of prosthetic dentistry.

However, there remains one basis for remuneration upon which, in a general way, there can be no question as to its fairness, either by the profession or by the public. This is a charge, or at least a minimum charge, for the time required, whether it be for examination, advice, treatment, or mechanical work of any kind. Unquestionably, modern dentistry is an art, and from time immemorial all art has been deemed valuable in proportion to the time required to attain the required skill for its production. While to a certain extent it is true that an artist of any kind may be born, they are certainly also made, and the man of most brilliant capabilities who does not apply himself and work and drudge will not attain to the perfection that a man of medium ability will who toils conscientiously and intelligently early and late.

Neither does work mean necessarily manual labor alone, though many of our profession seem to so think. To make it a profession the mental powers must develop rapidly enough to direct in a constantly improving manner the work of the hands, and this requires application that is more wearing than any manual labor can be. He of us who works only with his hands, and never changes his methods from those in vogue at the time he was a student, we may say works, but there is no corresponding intellectual development; and though he may be the busiest man in his community, he is certainly not the most useful, and his work decreases, rather than increases, in value. And yet a charge for time in this case is far more equitable than by any other measurement. Opposed to this one who may not spend every moment of his time at the operating chair or the bench, but reads some and sees some, and thinks more, attends society meetings, comes in contact with other members of the profession, observes and reflects, oftentimes gains new ideas that are incalculable in their value, in that they assist him to accomplish the same work in less time, and do it better. In time the skill of such an one will develop, and his time will be more valuable than his before-mentioned brother, and he will be justified in increasing his fees. But this man can find no more honest method for measuring his worth than by charging for time required.

The man who thoughtfully and studiously works out a more thorough or specific manner of treating lesions is certainly entitled to compensation for the time in which he was evolving the idea, to say nothing of a return for the expense incurred in practical experiments; certainly more so than the man who copies it is entitled to compensation for executing it. And I protest that it is as unprofessional for us not to support and approve of this position when earned and taken by one of our brethren, to whom we are all immeasurably indebted, as it is for the cheap mountebanks to advertise something for nothing in the daily press or the scattered circular.

It seems to me that it is possible for us to come to an understanding as to a minimum charge for time required in all general operations; that is, to adopt as a standard the value of the time required for doing the common operations in dentistry. To those who furnish the artistic designs and the more absolute methods of treatment let us gladly acquiesce in an increased valuation of their time. There is a field for usefulness to humanity in our profession, the breadth and future possibility of which is scarcely equaled by any other profession. To do his best one needs almost the knowledge of a physician, the skill of the surgeon and the artist, the ability of the mechanical engineer, the insight of the chemist and metallurgist.

What, then, is needed but an honorable, self-respecting obedience to a code or custom which has in mind the greatest good to the greatest number; that shall show to the public that we are a broad-minded and liberally educated profession, with a just appreciation of the rights of our fellow-dentists, as well as our own, to gain the place for us in public estimation and confidence that other professions enjoy, that we may have the standing in a community that rightfully belongs to us by deserving it; and as a step toward reaching our desire I submit the thoughts embodied in this paper.

CASE OF ABSCESS OF THE ANTRUM.

BY J. N. GARLINGHOUSE, D.D.S., CLINTON, N. Y.

(Read before the Union Meeting of the Fifth District Dental Society of the State of New York and the Jefferson County Dental Society, April 11, 1900.)

To the average practitioner an abscess of the antrum (or, more correctly speaking, maxillary sinus) is a decided rarity. Having recently had a rather curious and very stubborn case come under my observation, and being very much interested in it myself, it occurred to me that a history of the case and its treatment might be of interest to my professional brethren.

The patient, a young man of twenty years, came to me in July, 1899, and complained of an almost continuous discharge of bloody pus from a small opening directly over the root of the right upper central incisor. Upon questioning him I learned that in the winter of 1895 he had been confined to his bed for some two or three days with an abscessed tooth, his face being swollen to such an extent that the right eye was completely closed and he was unable to eat anything but liquid food. His family physician was called and lanced the abscess, advising him to see a dentist directly he was able to be out again. But, like a great many others in his position, when the soreness was gone so also was his good resolution to attend to his teeth, and although he was constantly troubled with a disagreeable discharge of pus there was no pain; so he allowed it to run along for four years, until he decided to take unto himself a wife, and I suppose the young lady of his choice objected to the unpleasant odor of his breath. These last are conclusions which I myself have drawn; he did not confide in me to that extent.

Upon examination I found what appeared to be the fistulous opening of a chronic alveolar abscess, and, as the right upper central was dead, I opened into the root-canal through the palatal surface of the tooth and endeavored to force warm water through the tooth and fistula, but was unable to do so. Upon using hydrogen dioxid I found the tooth itself in a very good condition, there being no evidence of pus within the canal; so after packing with iodoform I sealed up the root and devoted my attention to the fistula, which I washed out with warm water followed by hydrogen dioxid, and finally a drop of full strength carbolic acid, and made an application of iodin and aconite to the surrounding gum-tissue, after which I dismissed him, telling him to call again in a week.

I did not see the case again for three months, when he came to me with his face slightly swollen in the region of the right eye, which was a trifle inflamed, and complained of a dull ache all over the right side of his face and head. His excuse for not coming to me within a week after the first treatment was that the flow of pus had ceased, and he had experienced no pain whatever until a few days before his present call upon me, when his face began to swell, and the pain started from his eye first and gradually worked back until the whole right side of the head was affected.

Probing through the fistula with a fine silver probe, I discovered that I could push the probe back through the body of the superior maxillary bone nearly to the floor of the orbit. On removing the probe nearly a teaspoonful of bloody pus followed it, and the pain in the head ceased almost instantly.

My diagnosis was abscess of the antrum. After thoroughly washing out the opening through the alveolus with tepid water, followed by a saturated solution of boracic acid, I placed a dressing in the canal prepared by twisting three strands of floss silk (which had previously been boiled), and dusting it over with iodoform powder. My object was to keep the canal open to allow drainage and to facilitate enlarging it, which I intended to do at the next sitting. I then dismissed the patient for three days, during which time I prepared a quantity of iodoform gauze, suitable for dressing, by rolling strips of bibulous paper, about four inches long by two inches wide, standing them on end in a large-mouthed, glass-stoppered bottle, dusting with iodoform, and shaking the bottle until the iodoform was evenly distributed over the lot. I then placed the bottle, tightly closed, in my vulcanizer with a small quantity of water, and heated it to 320° F., keeping it there for half an hour. On a previous occasion, having use for gauze in a very small opening, I attempted to use ready-prepared surgeon's gauze, but found it too coarse. My bibulous paper gauze worked to perfection, being much easier to introduce into the canal, and its absorbing qualities render it of more value to the uses of the dental surgeon than the coarser ready-prepared article.

I also prepared a suitable drill for enlarging the canal, by soldering the shank of a one-eighth-inch vulcanite bur to that of the longest screw mandrel I could obtain. By squaring one end of each and fitting a ferrule of German silver I was enabled to obtain a very smooth joint, and a true-running instrument which was nearly twice as long as an ordinary bur. A probe for the introduction of dressings I made of silver wire slightly roughened at one end.

When the patient called again I learned that the soreness in the face had entirely gone, but as the drainage was deficient I enlarged the canal by drilling with the bur made for that purpose, and washed out the cavity, using plenty of warm water followed by hydrogen dioxid, and packed the canal with iodoform gauze.

I did not again see the case until January 22, 1900. The patient himself had removed the gauze and let things take their own course. The canal had again become stopped, the soreness and swelling returning, and he then came to me with his usual tale of woe. I told him that he must keep his appointments in the future, or I should be compelled to drop the case.

With his promise to so do, I again drilled through the canal, and repeated the previous treatment.

My notes on the case from January 22 to the present time read as follows:

January 23.—Removal of old gauze was followed by discharge of about a thimbleful of bloody pus. Syringed with warm water, followed by hydrogen dioxid. Packed with gauze.

January 24.—Found even more pus and blood than on previous day. Treatment the same.

January 25.—Copious discharge of pus. Less blood. Washed out with water, followed by boracic acid solution. Injected a drop of iodin and packed with gauze.

January 26.—Slight improvement in condition of things. Less pus. Treatment same as usual, minus iodin. Some pain in face, and opening into canal very sore.

January 27.—Patient has trouble with gauze coming out when he blows his nose. Treatment same.

January 29.—Gauze lost out January 27. Found opening partly closed. Obliged to use engine bur again. Washed out as usual. Injected one drop full strength carbolic acid. Renewed gauze dressing.

January 30.—No change. Washed with listerine fifty per cent. solution.

January 31.—Marked improvement. Very little pus. Soreness gone from face. Canal washed with warm water and listerine. Injected iodin.

I followed this same line of treatment, the case improving gradually, from January 31 to March 1, when there was apparently no pus, and I painted the gum around the opening with iodin.

Since March 1 I have been treating the case once a week, washing as well as possible with tepid water and a solution of boracic acid. The opening is now practically healed, and the patient is in better health than he has enjoyed for several years.

BRIDGE-WORK—A FEW SELECTED CASES.

BY F. W. PROSEUS, D.D.S., ROCHESTER, N. Y.

(Read before the Seventh District Dental Society of the State of New York, April 24, 1900.)

In the construction of lower bridge dentures and crowns for the bicuspids and molars it has been my pleasure, in certain cases, to use the following method with success, for supplying the bridge and occasionally the abutment teeth. Rubber plate teeth are selected slightly narrower than the space to be filled, and the necks ground flat nearly to the pins. A wire measurement is taken around the body of the plate teeth, and gold band made and fitted tight; this can be done by burnishing. A heavy piece of plate should be used for the bottom.

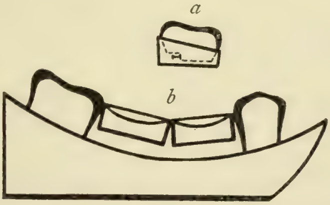
When the box is completed it should appear as in *a*, the labial side being slightly lower than the lingual, thus allowing the porcelain more exposure on its front surface, as shown.

The boxes are now ready for waxing to the abutment teeth (*b*), and articulation made perfect. The porcelain is removed from the boxes, investment made, and V-shaped spaces between crowns and boxes heavily soldered. After polishing, the porcelains should be cemented in the boxes, and the case is ready for adjustment.

When a bridge or crown made in this manner for the lower teeth is in place the results are highly gratifying; the porcelain teeth simulate nature very closely, and the objection to a row of gold cusps showing whenever the patient's lips are slightly opened is overcome.

When a bicuspid or molar root is banded, and cap made as for a Richmond crown, an impression and bite can be taken, and a box fitted and articulated to the cap on the cast.

Crown and bridge teeth may be quickly made in this manner, and the full case soon finished, as it requires no loss of time in heating up for the solder.



In a paper read before this society three years ago, I mentioned the use of all-gold bridges for lower bicuspids and molars, where the bite was close or great strength was required.

My method of making these bridge teeth is to swage them by the Morrison system, fill the cusps heavily with a high-carat solder, trim them to the desired shape over the gum, and fit a piece of plate to entirely close the shell; a few small pieces of 18 k. solder are placed inside, and if properly flowed will give a strong, heavy, tight tooth. After waxing in place I invest such cases so as to solder from the top and sides, using small pieces of 18 k. solder; and when taken from the investment no polishing is required except the brush wheel between each tooth.

In the use of the Logan crown I have had very gratifying success by setting it with high-heat gutta-percha; being sure that the root to be crowned is fully as large at all points of its circumference as the Logan to be used. I fit the Logan crown by grinding the best I can without using too much time, being sure that at least a point touches or fits labially and lingually. A cone of gutta-percha is formed to the pin. Have ready at hand a sponge or large piece of cotton saturated with cold water. Heat the porcelain of the Logan gradually in the flame until the gutta-percha is at its highest heat without burning; grasp the tooth with a thick napkin, and press quickly and firmly to place, and almost in the same movement cover the entire tooth and gum with the wet sponge or cotton saturated with cold water. If this is properly done the patient will seldom know that you have used a very hot material in setting the tooth. Now, take a thin hot instrument, and if the root is not smaller than the crown you can quickly trim the excess of gutta-percha from around the gum. By this method of setting Logan crowns I feel certain of a good joint and easy removal of the pin, should the crown break or other conditions necessitate removal.

GINGIVITIS: SOME OF THE CAUSES AND TREATMENT.

BY DR. E. E. HARRINGTON, WATERTOWN, N. Y.

(Read before the Union Meeting of the Fifth District Dental Society of the State of New York and the Jefferson County Dental Society, April 11, 1900.)

Of gingivitis the most frequent causes are accumulations of dental calculi or tartar, with which all are more or less familiar. Its removal, considered by many of little importance, is often one of the most difficult operations in dental surgery. If allowed to remain upon the roots it is the great local cause of pyorrhea alveolaris, on which disease, undoubtedly, more time has been spent at dental meetings than on any other subject relating to dental science.

This disease, if well established, is practically incurable. Thorough and scientific treatment by the dentist and physician, with full co-operation of the patient, may hold it in check; but a cure is rarely effected. Admitting this to be one of the most destructive and troublesome of dental lesions, are we, as dentists, doing all in our power to prevent its inception?

We have all seen patients who had recently been treated by their dentists. Their teeth were beautifully filled, but evidently no effort had been made to remove tartar that had accumulated in quantities sufficient to cause great inflammation and pain, the gum-tissues bleeding on the slightest pressure. Why do not dentists more generally remove this great cause of inflammation? Answers to this question by many have been: Its removal will do little good, as the cause is constitutional; it prevents cures; patients are not willing to pay a suitable price for its thorough removal, etc.

You have heard these and other excuses, but really, why will honest, conscientious operators neglect so important and necessary duty? Can it be possible they do not realize how large a percentage of teeth are lost from neglect in this respect? Several sittings are often necessary to thoroughly remove all concretions. At each subsequent sitting the gums will appear normal where the removal is complete, allowing the operator to see clearly by contrast where particles remain.

Calculus should be removed by instruments, as delicate as possible, passed carefully around the piece. In aggravated cases where serumal tartar is present, the trichloracetic acid is an assistance in dissolving the particles remaining. We have also used fifty per cent. commercial sulfuric acid with splendid results. Either should be worked well into the pockets. In completing its removal, sulfuric acid acts not only as a solvent of tartar, but throws off diseased tissues, leaving healthy surfaces.

Patients must be instructed to use great care, together with some antiseptic, in thoroughly cleansing the parts daily. Instructions should be given to come for treatment frequently, or whenever bleeding occurs in brushing the teeth. When the condition is evidently partly constitutional, patients should be advised as to habits, diet, or exercise. In many cases the results have been most gratifying where acid fruits have been largely used, together with the increased use of water. One of our most troublesome cases of inflammation from serumal calculus was relieved by the constant use of one pint of lithia water before retiring.

Active exercise in the open air is an indispensable requisite. Such precautions, if suggested by the dentist and faithfully followed by the patient, will produce good results.

Intelligent people, when informed of the importance of having the tartar thoroughly removed, will usually be willing to pay a suitable fee, even if they had never paid but one dollar before to have their teeth cleaned.

A frequent cause of local inflammation is the gold crown. Many are improperly fitted and a source of great irritation. If the tooth is nicely shaped and pure or 22 k. gold used for bands, a much closer adaptation can be secured than with the copper alloyed gold coin so much in use. The coin gold can be used for articulating surfaces, where it answers the purpose admirably.

Bands must not press to any extent on either the peridental membrane or process, or serious results will follow. Crowns should be accurately articulated, or they may be the source of trouble. Where edges of amalgam, gold, or cement are left to irritate the tissues, especially in approximal cavities in the posterior teeth, much injury is done; food is allowed to lodge and catch between the teeth, soon causing the patient to avoid mastication on that side of the mouth, thereby preventing the use of nature's tooth-brush, thus tending to further aggravate the trouble by rapid formation of tartar and other *débris.*

All teeth or roots that cannot be restored to health and usefulness should be promptly removed.

If by giving attention and relief to such primary causes we can, in a measure, prevent results sure to follow neglect, are we not doing our patients a most valuable and necessary service?

THE RESTORATION OF BADLY BROKEN-DOWN MOLARS AND BICUSPIDS.

BY F. MESSERSCHMITT, D.D.S., ROCHESTER, N. Y.

(Read before the Seventh District Dental Society of the State of New York, April 24, 1900.)

THESE cases usually present themselves with a large anterior or posterior approximal cavity extending far below the gum-margin, with an exposed or, in most instances, a dead pulp. Being at a loss how to proceed to restore these teeth to their proper shape, or how to adjust the rubber dam so as to be able to properly cleanse and fill the root-canals, the forceps are usually resorted to, and numerous teeth are extracted that could and should be saved and do good service for many years to come.

I have used a method for several years with such good results that I take this opportunity to present it for consideration and criticism. I usually treat the tooth several times, so as to get rid of the soft tissue that partly or completely fills the cavity, after which the circumference of the tooth can be obtained by any of the familiar methods. I use the silk ligature for this purpose, because it passes between the teeth more readily than the heavier materials. After getting the size of the tooth, a piece of German silver, the same length as the ligature, is cut from a piece of German silver plate, 35 gauge (Brown & Sharpe), or thicker if it can be used, and the ends soldered together with silver or soft solder; the band is slipped over the tooth in the mouth, gently driven down to place with the mallet, removed from time to time, and cut out to fit perfectly around the gum, the same as in making a crown. The band may project slightly at the gum-margin on the buccal side of some teeth, on account of the bulge in the tooth, but the cement will fill up this space. After it fits nicely and passes beyond the broken-down edge of the cavity, the upper portion of the band is cut out, so as not to interfere with the articulation. The edges of the cavity are well cut away; the tooth is cleansed perfectly, napkin applied, and band firmly cemented to the tooth. After the cement becomes thoroughly hard the rubber dam is applied over the band and adjoining teeth, when the cavity can be nicely prepared, canals cleansed perfectly with sulfuric acid (without danger of getting it in the patient's mouth), filled in the usual manner, and the tooth restored to its proper shape with amalgam. The patient is then dismissed until a later day, when the band is cut off and the filling is finished with strips and the polishing wheels. I pass around several models of a case, showing the teeth before and after restoration, without the use of anchor screws or crowns, and doing very good service.

CASE OF MAXILLARY NECROSIS.

BY DELANCEY B. ARMSTRONG, D.D.S., WATERTOWN, N. Y.

(Read before the Union Meeting of the Fifth District Dental Society of the State of New York and the Jefferson County Dental Society, April 11, 1900.)

OBJECT lessons of the incompetency and gross carelessness of the hospital service, both during and after the war, multiply day by day.

Reference is made to the case of one Stanley Forsythe, one of the first to volunteer from Watertown, N. Y. He went through the Santiago campaign. While in Cuba he had a siege of malarial fever. During the time of his illness he received some attention from the hospital doctors; how much can but be judged from results.

About the first of August, 1898, he returned to Watertown and came to my office to consult me in regard to the condition that existed in his mouth. I examined and made a discovery that surprised me. I found on the right side, at the posterior margin of the hard palate, a perforation about the size and shape of one of our silver three-cent pieces, its circular edges being well defined. The opening described connected the nasal with the oral cavity, and produced that impairment of speech noticeable in such cases. I asked him how he accounted for the opening in his mouth, and he replied, "When I had the fever I lay out on the ground in an unconscious condition. The sun was very hot. My mouth must have been open, and flies or other insects crawled in and out at will and deposited eggs that developed into worms, for when I returned to consciousness I turned my head and little worms would drop out. When I would blow my nose worms would come from the nostril."

This was a very nauseating story, but, nevertheless, a true one. He was not in a very good condition, and remarked that he had better rest up a little. He joined a party at a summer resort in the woods, and on his return I expected to make some appliance to cover the opening in his mouth.

In six weeks from the time I first saw Forsythe, he appeared at my office one morning in a deplorable condition. His face was swollen badly. The antrum was engorged so that the orbital floor, the nasal wall, and the outer wall were greatly displaced and distended. The swelling extended as far back as the ear. A thick, purulent discharge came from the right nostril, and on blowing the nose little particles of broken tissue would come away. The odor was very offensive, and the condition generally was revolting in the extreme. I decided that an operation would be necessary, and accordingly made preparations for the same the next day. He had a temperature at this time of 102½°. With the use of trephines, driven by electric engine, I made a good-sized opening into the antrum in the region of the first and second molars, they being absent. By the use of bone forceps, the opening was enlarged so that the finger could be readily introduced and gave free access to the cavity for the introduction of instruments and inspection with the eye. At the first opening the engorged condition relieved itself of a large quantity of pus, decayed tissue, fine particles of necrosed bone, a mixture with different characteristics than the product of any inflammation I have ever met in my experience. With a curette I cleaned what soft particles and destroyed tissue could be removed with safety, for there did not appear to be anything of a firm or healthy nature; washed out the cavity with warm water with a little boric acid added. Iodoform powder was insufflated. Low diet was ordered, and nurse directed to irrigate the cavity every four hours with boric acid wash. The case was now given over to the care of the family physician. The following day the temperature had dropped a trifle, condition of the patient seemed improved, and he remained in about the same condition for the next week; treatment about the same as first ordered with slight variations. At the end of the tenth day his temperature began to rise, and active inflammatory conditions set in of a rapid and destructive nature. At the end of the second week he had considerable fever, and was delirious at times. Finally, notwithstanding the best hospital nursing and medical advice and attendance, he became unconscious. It was impossible to stop the ravages of destructive inflammation that the worms had started, and he died about four weeks from the date of operation.

I report this because of the peculiar and original cause of the trouble, and nothing but war could produce such circumstances; and it is a truth that we lost more men from disease and lack of care than from any other cause.

PROCEEDINGS OF SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The thirty-third anniversary meeting of the New York Odontological Society was held on the afternoon and evening of January 16, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city.

AFTERNOON SESSION.

Dr. JOSEPH HEAD, of Philadelphia, gave a very interesting clinic on porcelain inlays. After the demonstration the gentlemen were called to order by the president of the society, Dr. W. W. Walker, and Dr. Head read a paper on the subject of "Shadow Problems of Porcelain Inlays."*

Discussion.

Dr. E. S. GAYLORD, of New Haven. I did not have the pleasure of seeing Dr. Head make these inlays, and I would like to ask him how much trouble he has with the porcelain becoming porous in baking. I confess to a great deal of trouble in that direction, so much so that I would not dare to appear in public to demonstrate the making of an inlay.

Dr. JOS. HEAD. I can say that when I used the low-fusing body I also had a great deal of trouble in that way, but since I have been using the high-fusing body no such difficulty has appeared.

Dr. GAYLORD. I refer to the high-fusing, as I have abandoned the use of the other.

Dr. HEAD. If the Consolidated body is mixed too wet, and is dried out too quickly, that may be one reason for its becoming porous; but where it is allowed to dry slowly, and to shrink evenly from the surface to the center, I have had no trouble.

Dr. C. A. MEEKER, of Newark. Do not too long baking and overheating produce porosity, in Dr. Head's experience?

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*Printed in full at page 523 of the current number.

Dr. HEAD. Yes, I think it will. Porcelain is composed of a large number of unfused particles joined together with the finer particles that do fuse, making a sort of concrete. If we keep on indefinitely fusing, the small particles of air, which in spite of our best efforts may be caught, will flow together and form a bubble, and cause porosity. There are very few porcelains that will not become porous if overheated. That is one of the most essential things, not to overheat the porcelain. It is not so difficult to fuse it as it should be fused, and a very little practice will make that a minor trouble.

I have a piece of unbleached, unsized muslin, that I always keep to get my standard of moisture for my mixes. I take my colors as I think they ought to be mixed,—as a painter would. After making that mass quite wet, I take three or four thicknesses of the unbleached muslin as I would a piece of blotting paper, and take out all the moisture that will come out. When I have done that I build on my contour, tap on my pliers, and the moisture flows to the surface; then I turn it upside down upon the muslin and allow all the excess moisture to be taken out again, and then I put it into the oven and allow it to become chalk white, which shows the moisture is all gone, and then I proceed to the fusing.

Dr. H. W. GILLETT, of Newport. Most of my experience has been with the low-fusing bodies, chiefly the Jenkins. Thus far I have found the Jenkins material more easy to manipulate than any other that I have tried, and I have been well satisfied with it in simple cavities. I shall try with much interest this new high-fusing body which Dr. Head presents.

I wish we might have further progress in the cement problem. There is a dissolved amber cement used by jewelers that I had hoped for good results from. By allowing the solvent to evaporate, a thick gummy mass is obtained which I have used successfully for cementing pieces of glass. It shows good strength and is entirely transparent. The evaporation of the rest of the solvent, however, requires about forty-eight hours.

My experiments were interrupted, but I have not yet given up hope of being able to report good results from its use.

Dr. R. M. SANGER, of Orange, N. J. The problem of shadows is one which has perplexed me very much, and while I do not think I fully understand now all that Dr. Head has said, and have not found clearly defined the remedy I am looking for, still I feel encouraged in that he has opened the discussion from a new point, which may lead to its final satisfactory solution. The question of cements is one which is very vexatious, and while I have heard a number of gentlemen state that a porcelain inlay once cemented in is in to stay, I regret to say that that has not been my universal experience. Not the solution of the shadow problem alone, but the "stick-to-it-iveness" is being looked for by men in work of this kind.

Dr. HEAD. There is one point that is of special interest, inasmuch as large contours, under certain conditions, may have a tendency to cause porosity. If a large piece of fused porcelain is placed in the midst of a filling, or in the matrix where a large filling is to be, wherever that large porcelain lies against the new powder before it is fused there will be air spaces. In the porcelain made by the Dental Supply Company, there is a high-fusing powder that has practically no color. I first mix my colors as I expect them to be, and for the first baking I take one-quarter of this high-fusing powder that does not fuse at all, and mixing this with it, fusing it all contracts evenly toward the center, and any air spaces that may be there are so finely divided up in the porcelain that they do not show. It is not needed in the second baking, and the pure enamel is used on the outside, giving the true color.

Dr. GILLETT. I ought to say, in justice to the Jenkins body, that in my hands it does not show the porosity so much complained of by some users of the low-fusing bodies. I find it very satisfactory within a certain range of colors, but the list of colors sent out by Dr. Jenkins is unsatisfactory for my use. There seem to me a great many useless colors, which might well be replaced with others.

Dr. MEEKER. I would like to ask Dr. Head how he manages to remove the matrix from the porcelain so easily. I often have considerable trouble in doing so, and sometimes leave pieces of the platinum on the inlay.

Dr. HEAD. When I began this work I got some of the platinum foil that had been hammered into shape, and there were innumerable small holes running through it. It was my sorrow and regret to find that whenever I attempted to remove that platinum from the porcelain small portions of it ran into the holes and dovetailed it on. If the platinum is free from tear or rupture, and is pulled always from the edge, there will be no difficulty in removing it clean, and if by any chance a small portion of the platinum should remain on the bottom, some distance from the edge, there can be no objection to it, as it will not interfere with the color. I use the platinum made by Baker Bros., of Newark. It is the softest and best I know of; I use it one one-thousandth of an inch fine. Many of my brothers in this field prefer platinum thinner than that. If it is desired, platinum as thin as one four-thousandth to one five-thousandth of an inch can be secured. I have never used it, although I have some at home, because when platinum is put on the edge of the filling the burnishing necessary tends to stretch it so that before it is finished I feel that the platinum is not more than one three-thousandth to one four-thousandth of an inch thick. If one takes it one four-thousandth of an inch at the start, it is likely that the edge will be burnished through, and that is a serious fault, because any rupture at the edge tends to cause distortion of the filling.

Dr. R. H. HOFHEINZ, of Rochester. I would like to ask Dr. Head whether he anneals his platinum in the electric oven, and if he finds any difference in its working capacity whether annealed by electricity or by gas. I would also like to ask at what temperature his bodies fuse. When I heard the president announce the subject of shadows, I was somewhat in hopes that Dr. Head, who has done so much in developing the subject, would speak of the shadows of another kind; because there are a great many shadows to porcelain inlays, aside from those he has mentioned. I have seen beautiful work done by Dr. Head, which he exhibited at the meeting of the National Dental Association, and I have spent some time with Dr. Jenkins, in Dresden, and have seen his beautiful work; but to look upon porcelain inlays as a revolutionary method of operative dentistry is wrong. There may come a time when that may be so. Dr. Head said he uses the platinum one one-thousandth of an inch thick. This matters little if he applies it in labial or buccal surfaces. Let us assume that he does use it, as I have seen other porcelain men do, almost indiscriminately, in complicated approximal cavities of bicuspids and molars. That one one-thousandth of an inch is filled with the most unreliable filling-material we know of,—oxyphosphate of zinc,—particularly at the cervical margin. I wish to throw that shadow upon this process, which is not new, although the method is new. The *International Dental Journal* tells us that some skulls three thousand years old have been exhumed at Honduras which had inlays of green jade in the teeth. Dr. Head has done some of the most beautiful approximal bicuspid work which I have seen, but I deny that that is the proper method, as yet, to fill those particular cavities, because the one one-thousandth of an inch of oxyphosphate of zinc must in time undergo a washing out, owing to the detrimental influence of the lactic acid, and makes it impossible to do that work permanently, except you protect those walls with something else. I have endeavored to fill those cervical walls with amalgam, and have gone so far as to protect buccal and lingual walls by filling them with some other material and then setting in the porcelain inlays; but that can only be done where it would be invisible. That in itself requires a great amount of time,—greater than that required by a skillful operator to put in that same filling with gold, or gold and tin, at the cervical border. I have received a great many elucidations in regard to the shadows Dr. Head has mentioned. The particular shadow I have reference to is the shadow that is thrown upon this class of work by a possible indiscriminate use of it, the same as we have had in crown- and bridge-work. The only reason why we may possibly not have that careless use is because it serves an esthetic purpose, and as such it will never become an advertising medium.

Dr. L. D. SHEPARD, of Boston. I have been very much interested in the paper, and in the work of Dr. Head. I have had a little experience in this work, dating back to the very unsatisfactory use of glass, some years ago, and I still have in the mouths of some of my patients the glass fillings, jet black, put in about eight years ago. The oxyphosphate may have dissolved out, and something else taken its place, but the black, unsightly glass is still there, and as these particular cavities are on the labial surfaces of lower cuspids, covered by the lip, I have not removed them, because they do not show. The best proof I have of the value of this work for durability is the permanence of those unsightly operations of many years ago. Perhaps that testimony is worth something in connection with the remarks of the last speaker.

My friend Dr. Young, of Leipzig, who has, by reason of his neighborhood to Dr. Jenkins, had considerable experience with the Jenkins body, told me last year that the secret of the use of the Jenkins method was in a slow fusing of the material. In a body containing water and air, if fused rapidly, the air spaces will be inclosed, as in the ice we sometimes see. All clear ice is ice that is frozen slowly, layer on layer, leaving a chance for the air to be excluded as the water congeals; so I am inclined to the opinion that this explanation of Dr. Young to me many months ago may be the means of avoiding porosity in the fusing of the low-fusing materials.

Dr. S. G. Perry. This new departure in dentistry is a departure in the direction of art. The art is so new that we are feeling in the dark, and we are only too glad to listen to any one who can give us any light upon it. If you see dentists on the street talking to each other, you may know they are talking of inlays. We want experience, and the value of this meeting lies in that direction.

The other day I paid a bill of ten dollars for an old vase that my wife had had repaired. I thought I would like to know what the man used, and I went down that afternoon to see if I could get any facts from him. The old man was out, but a boy about ten years old was in. He showed me some fish glue, but said there was a bottle that the old man used for certain kinds of repairs, and he tells the people they can wash the articles repaired with it as much as they wish, with hot or cold water, and it is all right. A quarter procured a little of it. When I got home I used it as well as I could with his directions. The trouble was as I expected, that it could not be kept dry long enough in the mouth to get as hard as it should be, so I did not go very far with it. I put in one or two inlays with it in some old teeth I had, and laid them aside to dry, and the day after you could not get them out. Whether there is anything in it for us I do not know. I give you this little hint, and some one may work it up. Some of those men who repair porcelain may have some sort of cement that can be used in that way. The boy said he thought it was some sort of French stuff. How well we remember the new instrument, or the new method, about which we said, "This is the year of all years in dentistry. How glad we are we live in this year!" But the time has not come yet when we can really say that that was the year. Some of you may know my views on the display of gold in the human mouth. It has been like shaking a red rag before a bull to have any one talk about it even. I always thought it was not worthy of us as a profession. I am thankful that the time has come when the display of gold in the front of the mouth will not be tolerated, and will not be necessary, and we can congratulate ourselves when we have something of this kind presented to us. Fillings of this kind will probably be used in the back of the mouth where gold would be better, but for the purpose of making the mouth presentable, for the purpose of beautifying, as far as possible, the human face, just think of the possibilities that lie within your hands! While in the past we have been interested in the scientific side of dentistry, we will now, I hope, consider it from the esthetic and artistic side.

I want to say a word in regard to making contour fillings on the bicuspids and molars. I have not only used amalgam, as Dr. Hofheinz said, in the cervical borders, but also gold in those very large cases where the teeth were too frail to build up entirely with gold, and where I would not venture with amalgam, and I have used the oxyphosphate for the rest of the cavity, telling the patients that they would have to be renewed every couple of years. If we attempt those porcelain fillings on the approximal surfaces, the first thing necessary will be to protect the cervical border with gold, or with amalgam, if necessary; then put in your inlay, and if failure comes on that fine line, it is not hidden so that it will be impossible to reach it. That is the note of warning that is to be sounded.

Dr. John I. Hart. All the warnings that have been thrown out are wise. We cannot be too conservative in those cases. Nearly every failure I have met with has been in the simpler cases. The only reason I can attribute for the failures is that I did not cut the cavities sufficiently deep, and consequently did not approximate sufficient surface of porcelain to the tooth-tissue. The objection to the general use of this work, mentioned by Professor Hofheinz, I think, is a warning in the right direction, and I think the surfaces that are sheltered are going to be the weak points in these cases. However, I do not think that should discourage us from doing it, because we will probably get, as necessity demands it, a character of oxyphosphate which will supply our demands. I have used in my practice platinum and gold to form the matrix of the cavity. The platinum and gold can be worked down sufficiently thin, and it is much softer than the platinum alone. Dr. Head has promised to use some, and probably after we have used this we will get a matrix which will not tear as readily as the platinum alone. I think all discussions in this line of work are useful, and it is but fair to each other, as we meet with failures, that we report them, so we may get a definite line of practice, and good is sure to come from it.

Dr. Head. I should like to express my thanks to Dr. Hofheinz, Dr. Perry, and others, who have sounded these notes of warning. It is well to look at the evil as well as at the good, whenever a new field is opened, and a comparatively new idea presented, in spite of the fact that this is three thousand years old; still there are some things so old that they are new. It is perfectly true that in bicuspids and molars the cervical margins are most likely to give us trouble. When I first began to fill such approximal cavities, I was careful to guard the cervical margins, but as a year and a half or two years went by, and I still had good results from the places that were not guarded, where there was a perfectly even, clean joint, I felt that these fillings came somewhat under the classification of crowns.

I should like to speak of my friend Dr. Sutphen, who has two satisfactory approximal fillings in a bicuspid, and one in a molar. He has had them only four months. Up to the time he had these, he found only gutta-percha and cement feasible in those places, but the cement would wash out, and food would lodge. Knowing this to be so in other cases, as well as in his, I felt that where approximal cavities in molars and bicuspids were usually filled with oxyphosphate, if the porcelain gave the oxyphosphate a life only four times its usual length, and maintained the interdental space, I felt that such lengthening of life was in itself a great step. While this can be done to a certain extent, and very well done, by amalgam, where the cement is first put in a cavity and the amalgam put over it, still the blackening and the shrinkage which take place, with the exception of,—well, the new amalgam that is presented every year,—shows that the porcelain is superior. When we come to the porcelain fillings in approximal cavities of molars and bicuspids, we find the farther back a porcelain filling is placed in the mouth the greater the strain will be. Instead of having a force of sixty pounds, as exerted on the front teeth, we have a force of from one to two hundred pounds on the back teeth, and therefore in some instances, why not in all I cannot say, I have found that on the grinding-surfaces the edge of the porcelain would break. Wherever this occurs, it has been my custom to carefully put on the rubber dam, dry the tooth, and fill that fissure with gold, so overlapping the edge that the porcelain is protected. I have found in my experience of three years that the porcelain inlays are quite as serviceable as gold, and will preserve teeth that my experience seemed to indicate gold would not preserve; and they give a sightly appearance, and are capable of being placed in the cavity without the great nerve strain ordinarily necessary for a gold filling.

Dr. Hofheinz asked how I anneal my platinum. If the platinum be annealed in the plain open flame of a Bunsen burner, it becomes very harsh, because it absorbs gas; but if it be fused in the muffle of a gas furnace, where no gas can get at it, or in an electric furnace, it will become as soft as tin foil.

I wish, before closing, to heartily indorse all that has been said as a caution in this work. While I gave up putting in gold in approximal cavities to a great extent with a great deal of sorrow, because I was fond of the work, and while I went into this field, which was comparatively new, because I thought justice to my patients demanded it, I felt that I was to a certain extent taking risks upon myself; but as time goes on, and as those troubles are gradually being overcome, I feel much encouraged. I feel that with porcelain inlays to help us, dentistry can go on until it really accomplishes works of art that will be permanent and durable. We are groping in the dark, and should give each other light, and, while I stand up for the high-fusing body, I think every one who works in this field honestly and well, with the high or the low-fusing body, will be able to add his mite to that which in the future will tend to make perfection.

Adjournment.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, February 20, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city; the president, Dr. W. W. Walker, occupied the chair.

REPORT OF THE CLINIC COMMITTEE.

Dr. L. C. LEROY. At the clinic this afternoon Dr. O. A. Krone exhibited Dr. Timme's electric furnace. It consists of a metallic box, with an opening in front, in which are placed four partitions of fire clay and feldspar. The partitions have a series of minute channels through which the platinum wire is threaded or woven, and in case of the "burning out" of the wires they are easily repaired, either by resoldering or rewiring. Each partition is really a furnace in itself. The large furnace carries twelve amperes of current, and the small one seven amperes. The small one can be connected to any electric light outlet; the large one requires a special wiring. The small one permits of the case being gradually inserted for gradual heating, and precludes to some extent accidents from sudden overheating. Another advantage claimed is in the continuous-gum furnace, where the heat may be required to be concentrated to one side, as in the case of a plumper or a repair on one side. The bulk of the heat can be concentrated to that side, and the case repaired speedily and without danger of injury to the rest of the work.

Dr. Ottolengui presented a patient for whom he made a porcelain inlay, using a modification of the Jenkins furnace made by Dr. Kingsley.

The inlay was baked five times, and completed in fifty minutes. The contour and adaptation were excellent, but the color was not quite so good as another inlay which the clinician had made at his office. The making of the inlay this afternoon was for the purpose of demonstrating what can be done with that (low-fusing) body, and showed the excellence of that character of work.

Dr. Ames, of Chicago, was also present, and showed his method of swaging cusps of teeth.

There was also exhibited an electric bracket lamp that could be fixed at any angle.

Dr. R. OTTOLENGUI. About the grooving, I would say that the principal trouble I had had with inlays, prior to Dr. Jenkins's visit to this country last summer, was to make them stay in. The beauty of an inlay is well enough, but if you cannot achieve permanency you have not much of a success. In America they are particular about how many times you put them in, although in Europe they do not care. I had read in many places that after the inlay was ready to set you roughened it on the back and cut some grooves, but that never conveyed a real idea to me of how those grooves were made. The first time I saw Dr. Jenkins put in a filling, I immediately saw why his stayed in better than mine. The groove must follow the circumference of the filling, rather than its diameter, the result being that the filling, when it is ready for setting, might be said to resemble a collar button. I think that idea conveys as accurately as anything how it should be made. I was asked to-day how it could be carried out with a flat inlay. You follow with the diamond disk, copper charged with diamond dust, the real edge of the cavity as near as it is safe to do; you can rub a little cement in to make sure it will stay in place.

Dr. S. G. PERRY. Will you give a little more in detail the important steps from the beginning?

Dr. OTTOLENGUI. I feel very much like saying to-night what I said this afternoon, that in the whole porcelain affair my position is anomalous. I have been posing as a teacher, and yet I feel as if I were in the infant class. I do not feel as confident when I work porcelain as when I work gold. Some gentlemen feel more confident, but I have not reached that point. I can hardly claim that I have made any improvement on anything Dr. Jenkins has done. I saw Dr. George Evans this afternoon, and he said since Dr. Jenkins was here and gave his demonstration to Dr. Evans, he experimented in many directions to see if he could improve on the Jenkins method, using different investment materials, such as marble-dust and plaster; and he has come to the conclusion that he cannot get any improvement on it,—in fact, he seems to get worse results as he leaves Jenkins.

Dr. Jenkins uses powdered asbestos and water. He claims this investment aids in preventing a change of shape, and the investment holds the matrix against the shrinkage of the body. I do not think so. In my hands, I fail to find any advantage in the investment beyond the fact that it makes the matrix easily handled. I am perfectly satisfied that I can demonstrate that you cannot invest a certain kind of gold matrix in that investment so I cannot contract it out of shape, if I bake it.

We must admit, since Dr. Northrop taught it to us one night, that the low-fusing bodies contract more than the high. The low-fusing body must be baked a number of times in order to get an accurate fit, the reason being that what has once been baked does not shrink at subsequent bakings. If you fill up with body and bake it, the shrinkage will collapse it to some extent. If you put a little at one side and bake that, and then fill the other side and bake that, you do not contract the two sides; and with this body I think you can make a satisfactory filling. From what I have observed of the high-fusing bodies, using the platinum matrix, they cannot make fillings in as deep cavities as are made accessible by using the thin gold. I said this afternoon that the gold foil is better than the rolled gold, just as I think the rolled gold is better than the platinum, because it has less rigidity. In burnishing the matrix down care should be observed to get it down to the bottom of the cavity, regardless of what happens to the edges. It can be worked from the bottom toward the sides, and if there be any little wrinkle of gold, it is so soft that by pressing with the finger you get perfect adaptation. Where you cannot use the finger, use spunk or rubber. In using the thin gold I find it advisable to use as much gold as is possible. The gold which surrounds it is advantageous in two ways,—it makes the matrix more rigid, and at the same time gives you an impression of the other portions of the tooth, so when it is invested you practically have a gold replica of the tooth. It has been mentioned that I did not put the rubber dam on. That is for several reasons. The rubber dam would be in the way; certainly in approximal cavities in small spaces. The dam occupies some space, and, besides, there is no advantage in having it on, because you can work just as well or better without it; in addition to which you can keep your tooth wet until you are ready to place the filling, and then you can tell whether you have obtained your color. The color of the inlay is maintained by the Jenkins body by not overheating. I rather underheat it. I heat it up very slowly to a bright red heat. The filling in the fire will turn very white, and gradually become red with a dark spot in the center. I heat it up until the dark spot in the center is entirely red, and if at that instant it is taken out you will find the color correct.

I have not found any satisfactory cement. I think any cement which is very smooth can be used; the smoother the better. I have been using "Caulk's Diamond Cement," and have heard a number of gentlemen recommend Ash's cement, which is very smooth. This afternoon I was shown a cement made by Sanow & Hussey, of Philadelphia. I have tried a number of cements, but have found them of such coarse grain that I do not get along with them. With the Harvard cement I do not seem to have success. I tried once a cement which promised very well. There was a man in Atlanta, Ga., named Doyle, who introduced an enamel which was a solution of celluloid. I set an inlay with it and it was absolutely beautiful, but it came out in about a month.

Dr. N. W. KINGSLEY then read his paper, entitled "Has Legislation Cured Quackery?" It is printed in full at page 501 of the current number.

Discussion.

Dr. WILLIAM JARVIE. It has given me a great deal of pleasure, as I am sure it has to all of you, to hear our old friend Dr. Kingsley to-night. I take a little different view from that which he does of the present standing of the dental profession; but while we may differ in our views upon this subject, we are just as good friends. A synopsis of the paper was sent me with the request that I lead in the discussion. Wishing to be exact in some of my statements, and deeming the subject of considerable importance at the present time, I have adopted an unusual course for me and committed to paper what I have to offer.

If I were asked to reply with exactness and conciseness to the question propounded in the title of the paper we have just listened to,—viz, "Has Dental Legislation Cured Quackery?" I should answer positively "yes." This may startle you, but if you refer to the "Century Dictionary" you will find "quack" defined as "an impudent and fraudulent pretender to medical (or dental) skill."

Before 1879, any one who chose had a perfect right to practice dentistry in New York state. In that year a bill was passed permitting all who were practicing at that time to register and continue to practice. After 1879 all those who had dental diplomas were allowed to register also and commence practice.

Up to 1895 it might have been said with truth that legislation legalized quackery, for many who had diplomas were, in the words of the dictionary, "fraudulent pretenders to (dental) skill." But in 1895 it was enacted that no one, not even those who had diplomas, should commence the practice of dentistry in this state until they had passed a rigid examination as to their skill and knowledge at the hands of a board appointed by the regents of the University of the State of New York, and consisting of eight dentists selected by the State Dental Society for that purpose. The results of the early examinations by that board proved conclusively the wisdom of the legislation which created it, for they found the statement that many who had diplomas "were fraudulent pretenders to dental skill" was but too true. I need hardly tell you that these men were not licensed or permitted to commence practice, nor have any such been licensed to practice in this state since 1895; so that present legislation does not legalize quackery, but takes stringent measures to prevent it.

As the facts I have just stated were presumably known to the essayist, I cannot but think that he used the word "quackery" as implying a certain amount of deceit and imposture, but not necessarily involving incompetence. Quackery always does imply moral obliquity and ethical laxity.

The essayist proceeds to argue that inasmuch as dental legislation has not rid the profession of all incompetent and unethical practitioners, it has failed in its purpose, and the standard of the profession is lowered in the estimation of the community.

First. What was the purpose of dental legislation, and has it failed in that purpose?

Any effort to have debarred from practicing those who were rightfully entitled to before 1895 would have been unwise, unfair, and unconstitutional, and as certainly unsuccessful. So, realizing that our hopes lay in the future, rather than in the past, the aim the legislation had that year was to fix a standard of education necessary to commence the study of dentistry and to raise the standard of qualification necessary to commence its practice.

As I have already stated, as far as legislation was concerned, up to 1895 a person of any or no education whatever was permitted to matriculate in the dental schools. In the autumn of that year attendance for one year in a high school was required. In 1896 two years in a high school was required. In 1897, and since that time, three years in a high school has been required; and the three years' course in the high school embraces algebra, plane geometry, United States history, Greek and Roman history, Latin, Cæsar's

Commentaries, French, German, English composition, botany, physiology and hygiene, physics, and laboratory work.

Rather a comprehensive course to select from, and one which, if negotiations which are now pending should be consummated, would enable the student to register and enter the preliminary examination of the General Medical Council of Great Britain at the time of matriculation in our dental schools. Further on he could be registered from year to year as he passed his examinations here, until, when having completed his medical or dental course and received his license to practice from the University of the State of New York, that license would be acknowledged and registered in Great Britain.

That legislation and the attainment of higher standards in this state has had influence in other states I would prove by stating that New Jersey has adopted the same standard of education or matriculation as New York, and an interchange of licenses to practice dentistry has been arranged for between these two states, by which, if a dentist who has been licensed to practice in New York wishes to practice in New Jersey, he will be granted a license to practice there upon making application to the New Jersey Board of Examiners in proper form and paying the license fee. In like manner a dentist who has been licensed to practice in New Jersey will, upon application to the Board of Regents and payment of the license fee, receive a license to practice in this state without further examination. Negotiations have been pending for a like interchange between Pennsylvania and this state, but as yet the standards of Pennsylvania are not up to the requirements in this state; but this obstacle to an interchange we hope soon to see removed.

I have said that the aim of dental legislation had in 1895, and under which our profession is now regulated, was to fix a standard of education necessary to matriculation, and to raise the standard of qualification necessary to commence practice, and I think I have said enough to prove that this aim has been accomplished.

I have had twenty-five years' experience on examining boards, and during that time have been continually brought in contact with those about to enter the profession. During no part of this period has the advance in intelligence and education been so rapid or so marked as during the past five years, and the class of students entering the dental schools of this state will compare favorably with those entering any other of the learned professions.

Unfortunately, high moral purpose and refined instincts do not always go hand in hand with intelligence and education, and at times we see the "quack" described in Foster's "Encyclopedic Medical Dictionary" as "a practitioner who resorts to vulgar devices for obtaining practice, as by advertisements, public exhibitions," etc., and my sensibilities also are shocked frequently by catch-penny advertisements of the dental section of a department store, and by the signs of the dental parlors on the Bowery or Sixth avenue in Manhattan, and along Fulton street in Brooklyn.

But don't let us forget that the clientele of the members of this society are largely of the wealthy or well-to-do classes, while by far the largest proportion of the population of this great metropolis are poor or of very moderate means. This class have defective teeth, and they must be filled or extracted, and be replaced by artificial ones. This demand, like all others, has to be met, and, fortunately or unfortunately, there are those in the profession whose natural affinities attract or permit them to labor among this class and be satisfied with small fees, while oftentimes rendering fair practical service to those in need of it. Such establishments are not all bad. Infinitely better service is rendered in them than was a few years ago. The young graduates who operate there are intelligent and competent, and the cases of malpractice are rare compared to the days when the blacksmith shop and carpenter's bench supplied the recruits to the dental ranks.

No one is more ambitious than I am in regard to the high esteem in which I would have our profession held by the public. Not a recognition to be acquired by any legislative or legal process, but the recognition and respect that intelligence, education, ability, and merit always command.

The standing of the profession to-day, instead of being lowered in the estimation of the community and of the other professions, is higher than it ever was.

Intelligence and education are the standards by which men and professions are judged in highly civilized communities, and legislation, *dental* legislation, requires as high an educational standard for matriculation in the dental schools of this state as it requires in the law and medical schools.

That there are "quacks" among dentists I admit. So there are in law, in medicine, and in divinity, and, until the millennium arrives, there always will be. But this is in spite of legislation, and not because of it.

Dr. A. H. Brockway. I have heard the paper of Dr. Kingsley, and also the remarks of Dr. Jarvie, with very great interest. Of course, this question is one that has troubled many of us for a good while, and it is not at all surprising that Dr. Kingsley admits his inability to see a way out of it. I feel very much that way myself, but I think the remarks of Dr. Jarvie have given us all some encouragement. They certainly have encouraged me, and I think we need not be so much cast down as we have been inclined to be. I fancy that our salvation from this overhanging shadow will come from the legislature, as Dr. Jarvie has pointed out, and which I confess is more or less news to me, showing my ignorance of the subject; and also from the education of the community to what dentistry means. It is discouraging to see how little appreciation a great many passably intelligent people have of what dentistry implies, the importance of it and the necessity of employing men of earnest purpose as well as skill. If the restrictions which are put upon the entering of incompetent or unqualified men into the ranks of the profession are maintained and strengthened, I believe that we shall yet find a way out from this cloud which at present seems to overhang us.

Dr. R. M. Sanger, of East Orange, N. J. The paper of Dr.

Kingsley and the reply of Dr. Jarvie have been equally interesting to me. The first because of the remarkably pessimistic view that can be taken sometimes by a man who is ordinarily very broad in his ideas. I know Dr. Kingsley is, for I have known him for years; but that he or any other man should assume that any intelligent body of men had undertaken to form laws or lay down rules which were going to be an absolute cure for human nature's natural ills seems to me beyond comprehension. So long as man lives and men compete, just so long will fraud exist and dishonest and dishonorable methods be brought into play; and no law can be put into force which will eradicate that human tendency. On the other hand, it is a recognized fact that the most perfect law that is ever passed and put upon the statute books is that law which accomplishes the most good to the largest number of human beings. So good laws have been passed, and much has been accomplished. That this is true is undeniable. It is an axiom that "Rome was not built in a day," and that we have not accomplished all the good that can be accomplished is equally true. We are a growing profession. We are growing in the estimation of the rank and file of the human race. We stand to-day in the eyes of the people of the great cities and in intelligent communities as professional men, largely because of the laws which have been judiciously enacted in the various states. These environments have placed you upon a much higher pedestal, and have given you a right to a higher attainment than you have ever claimed; but the highest pedestal and the highest attainment is not yet, and therefore, Mr. President, it seems strange to me that Dr. Kingsley could have taken such a pessimistic view of the situation. On the other hand, Dr. Jarvie has taken a very able and a very dignified view of the opposite side of the question. I am glad to say that, instead of a cloud, I see sunshine. I see hope in the future, because of our dental legislation and higher educational standards. It is also hopeful that there are some men who will cast a shadow, in order that we may more fully appreciate the sunshine that follows that shadow.

Dr. S. G. PERRY. Mr. President, you have aroused me from a dream. The familiar tones of Dr. Kingsley's voice took me back to the old church in Fourth avenue, more than a quarter of a century ago, when he read a paper which made him known throughout the world; likewise the familiar tones of Dr. Brockway, also a quarter of a century ago; and also Dr. Jarvie's voice, at least twenty-five years ago. We all know that there is a great deal of truth in Dr. Kingsley's paper. Take a walk down any of the avenues, and you will see it is so. Dr. Jarvie's picture gives us more hope. It seems to me that the final remedy will be in a nearer approach to the medical profession, and I can look into the future and see the time when the taking of the medical degree or its equivalent will give the members of our profession a standing before the community which they can never otherwise have.

Dr. B. HOLLY SMITH, of Baltimore, Md. There can be no more pleasant traveling companion than the optimist. I like to stand back and let a man who is full of life come by, so I may catch some of his bright views. I always like to hear the sweet, kind, gentle voice of my friend Dr. Jarvie; I like to hear the pleasant things he says, and I like the nice, gentle way in which he says them. I take it that there can probably be no better answer to the paper than the answer that has been written by this gentleman, who does not do things by halves. Therefore, while I am on that side of the question, I am not disposed at all to turn a deaf ear to those people who give us warning, who issue a note of alarm. I am reminded a little of the time when legislation was not had in such showers as we have had it of late, and of the experience of the old man in the story told me by my friend Dr. Gingrich (who tells me all my stories of what is funny in life). This old gentleman objected to the coming of a railroad which was planned, and he urged the people in his community that these railroads ran over people and sheep and oxen, and did not, in fact, respect anything that lived. But, in spite of the opposition of the old man, the railroad came, and one afternoon the old man's wife said, "John, let us go up on the brow of the hill and look at this wonderful thing that has been built." And they walked hand in hand, and saw the new machinery and the tracks of the railroad as it came across the valley and round the little stream, until it was lost behind a hill. As they gazed an express train whizzed past, and after a moment the wife said, "John, it looks perfectly harmless." "It is all right now, Betsey," said the old man. "It is coming endwise now, but if that thing ever comes broadside through the valley it will clear out the place!"

So it seems to me if our legislation ever comes broadside it will be dangerous for a new-fledged dentist to be born. He will want some one to take care of him. It is a good thing to take this hopeful view of quackery. These things are gradually subsiding. No man can tell the progress of an age until it is past. We get discouraged, but I think one of the most hopeful things is the training in ethics of the young men in the schools. I find very few men whose lives come in contact with mine whose society is grateful to me, to whom I get close, who cannot be stirred with a sense of pride in the calling which they have chosen, and I believe that, although quackery and charlatanism will not entirely be abolished, they will gradually subside, and we will regard it as a nightmare of the past. God speed the day!

Dr. OTTOLENGUI. I suppose that I am expected to agree with Dr. Kingsley, but I do not. I more nearly agree with Dr. Jarvie. It seems to be the fashion to-night, because I presume we are near the end of the century, for everybody to talk about twenty-five years ago. Twenty-five years ago brings some very distinct pictures to my mind, which I think are pertinent to-night. Twenty-five years ago I remember very well what a quack was; we needed no dictionary to tell us. We did not have any living in my home in Charleston, but they got there every year about fair time, at the end of the crop season, when people had money, and they generally occupied a square near the market and pulled teeth free in the mornings, and for money at other times. Those were quacks, pure and simple, and their status was known in the community. I believe that legislation has weeded them out. I hear occasionally of one or two around the country. I had a photograph of one sent to me not very long ago; he wears a necklace of teeth, and puts on his cards his degrees and a list of the licenses to practice which he has obtained in various states of the Union. He is a quack who has to obey the law like everybody else, so as soon as he gets all he can out of one state he goes into another and gets a license to practice there by passing the examination. He had about ten the last time I heard of him. But if the quacks have gone, it seems to me it is something like what I have always heard claimed, although I do not know if it is true, that when a forest burns off another kind of tree grows up; and it is with the other kind of tree we have to deal now. I am not quite as optimistic about that as Dr. Jarvie is. Dr. Kingsley said that, aside from professional dentistry, we have dentistry as a trade and dentistry as an adjunct to a circus, by which he meant the dental offices in dry-goods stores. I will relate an incident in regard to both of these places, which will give some idea of how they are managed. I had a very interesting visit during the last two weeks from a young man who applied to me for a position; not with me exactly, but that I might assist him in getting one. Happening to have the time, I had quite a talk with him. He was a graduate from one of the prominent schools, and apparently a skillful operator. He is working in one of these places which advertise, and he does the crown- and bridge-work of that establishment. He tells me he gets forty dollars a week salary, which I told him I did not think he could get from any ethical dentist in New York. He also informed me that he lives on twenty dollars a week, and saves the balance. He has been there a year, and consequently had one thousand dollars in bank. I advised him to go into business for himself, and not become the adjunct of even an ethical establishment. I asked him why he had not done that in the first place, and he said his brother had done so and had failed. I told him perhaps his brother did not know how to go about it. He said he could not get an office under one thousand dollars a year, and he might not get enough business. I said, "Have you not met enough people in the business where you are who would come to you?" He said, "I have a girl assistant at my chair, and she is there all the time that patients are in the chair. I am not permitted to know the name of the patient, and the patient is not permitted to know my name; the girl is there for that purpose." Then I said, "You are not under any moral or other obligation to these people, and I should endeavor to get that girl out of the office as often as possible. Stay right where you are, get another thousand dollars, and you will have enough for a year's rent and enough to live on for a year, and you might make up a practice for yourself."

Now, there is a young man who has been caught in the meshes of that establishment. Whilst the law has improved the class of work which these places turn out, and that undoubtedly is a benefit to the public, it has not elevated the profession very much.

Now for the dental emporium in the dry-goods store. About two years ago I came in contact with a young woman who was with such an establishment. She had been selected for her experience in that sort of thing, having been in different places in the city. I asked her, "How do you accomplish your extractions without pain?" She said, "We inject an anesthetic." I said, "What is it?" And she said, "It has cocain in it." I asked, "Do you take the risk of injecting cocain in people's gums for extracting teeth? Don't you know it has caused death even in the hands of skilled operators?" She said, "We get the teeth out painlessly, principally because we advertise it. I cannot tell you the percentage of cocain, because it is too small to figure. There is just enough of the salt in a gallon of water to call it a cocain mixture." I said, "How is it possible for you to give proper attention to the treatment of cases and make it pay?" She said, "We get fifty cents for treating a tooth. We had a young man from Pennsylvania who was good at treatment, but we had to discharge him, as he did not make enough money for us." The rosy side of that is not quite as red as it has been painted.

I want to touch on the other thought that comes to me from this twenty-five years ago allusion. Dr. Jarvie has told us we have gradually come up to a preliminary requirement of three years in a high school. When I went into college first, the preliminary requirement was five dollars. I was not asked anything else, except to hand that over. I would say, however, that had I been asked at that time to come up to the requirement that is at present exacted, I could have met it, notwithstanding the fact that it was twenty-five years ago and that I was educated in the South, which was just recovering from the defeat of a long war. It therefore seems remarkable to me, after twenty-five years, when a boy as young as I was then had had the opportunity of going half through a classical college in that time, that any of the dental colleges should complain to-day that the standard of New York state is too high. It seems absolutely absurd, and I hope that the men in New York state will continue to hold that standard just as high as they do now, in spite of the efforts which I understand have been made in some directions to have it lowered. The legislation which has been enacted in this state has elevated dental education throughout the United States. The rest of the states have followed the lead of New York, and they have been compelled to come up. I feel we owe a great deal to our New York board for having solved the question of interstate exchange of licenses, which is so much to be desired. I think it will be a great deal better to take a little longer and get the interchange on the basis of a high standard, than to hurry up and let incompetents go from one state to another. Now that New York and New Jersey are exchanging licenses, and Pennsylvania trying to get in, that triumvirate will attract as a magnet does, and we will have all the other states following.

Dr. JOHN I. HART. I do not think that the gentlemen who have been perfecting the laws of this state ever had any idea that they could cause all members of the profession to become ethical. I think all they had in view was to sweep away those who were practicing illegally, and I think the record demonstrates that they have carried out everything they started to do. I thoroughly concur with the last speaker in the belief that if the laws have done nothing else, they have surely advanced the cause of dental education, and that the standard to-day in this state is no burden to the colleges. I do not think any of the colleges are complaining of the license requirements, if the examiners will only keep up a corresponding standard of entrance. There is no difficulty in educating men up to a given standard if they have had sufficient preliminary education to appreciate the teachings which they are to receive. I would suggest to Dr. Ottolengui that he should tell his friend that if he would call the attention of the Law Committee to the establishment referred to, they would probably see that the name was placed in a conspicuous place over the chair at which the party operates. The law now reads that every practitioner employing assistants shall have the name of the assistant in a conspicuous place in the office.

Dr. M. L. RHEIN. I have been very much interested in the discussion, and I have been thinking that it was wandering a little away from the subject. To my mind, in looking at the matter, there is a vast difference between what dental legislation has done for the advancement of dental education and what it has done for the decrease of quackery in the state of New York. My own view of the matter is that there are two forms of quacks. The incompetent and ignorant quack is by no means the only one; the man who is an impostor and who deceives in any form or manner is unquestionably as much a quack as the ignoramus. While I believe that legislation has abolished to a very great extent the ignorant quack, I must say I agree with the essayist that it has brought into the full glare of daylight the more dangerous specimen, the polished and well-educated quack, even the man of scientific ability. The ignorant quack is not a danger nor a menace to the public, and never has been to any great extent; but I have felt that there was danger when I have found upon my doorstep a circular stating that such-and-such an establishment has operators holding such-and-such degrees; that they are practicing under the full sanction of the laws of the state of New York, and the public was guaranteed to get the very best at the lowest prices.

It is very nice to be led away by the flowery language of Dr. Sanger and the optimistic views of Dr. Jarvie. I wish I could feel that way on the subject, but I do agree most heartily with the main thought of the essayist of the evening, that he has left to the earnest workers of the profession a problem that is very hard to solve; that is, how to decrease the quackery of the day, which is a dangerous form of quackery in comparison with the fakir pictured to us by Dr. Ottolengui as he saw him twenty-five years ago. How is it going to be possible to abate what all the speakers have recognized as a great curse upon the public who desire dental aid? They have all recognized the fact that the public is imposed upon by these establishments; that although the men may have the ability and the highest skill, they are not allowed to exercise that skill because they will interfere with the money-making instinct of the establishment.

That is a fearful picture to contemplate from a professional aspect. It is one that is not to be idly thrown aside. When they meet the men who are practicing in these establishments they are not meeting the ignoramuses of twenty years ago whom he knew as quacks, but they are meeting polished, educated gentlemen, who, perhaps through necessity, are imposing upon the public who come to patronize them. From this results the danger of the men who are legitimately practicing, endeavoring to make a livelihood, falling into a slipshod form of dentistry in order to compete to a certain extent with this form of quackery, because it is quackery in the highest essence of the word. I have been very much entertained with the last story of Dr. Weir Mitchell, of Philadelphia, the "Autobiography of a Quack." He presents him as a well-educated, polished man, who received a good education and understood medicine from beginning to end, but who abuses the knowledge and skill which he possesses.

If there is any salvation to be accomplished in this matter, it rests in the very thing that has made American dentistry preeminent throughout the world. It rests with every individual dentist, and the influence which he has upon his own clientele. If the doctrine is steadily taught that was taught by the teachers in dentistry when I entered the profession, that it was our duty to do the very best for every case that came before us in practice, and if we taught that thing to our patients when we did our work, it would place a barrier between educated quackery and legitimate dentistry. It would be only a question of time for the public to appreciate the legitimate practitioner.

This is the only thought on the subject that I would like to dwell upon, showing a way of lessening an evil that has undoubtedly developed to a very great extent. The educated quack of to-day has kept pace with all the legislative work done for elevating the educational standard of our profession. Honest work faithfully performed is our only remedy.

Dr. C. A. Meeker, of Newark, N. J. I have listened with great pleasure to Dr. Kingsley's paper. While it looks very pessimistic, we must have that kind of paper to keep us up to the mark. Dentists must not be too optimistic. In 1873, when our first law in New Jersey was enacted, our market place, like that in Charleston, used to be the resort of the traveling dentists. New Jersey was the dumping ground between New York and Pennsylvania for all the quacks, both medical and dental. The medical people were the first to take action, with laws for repression; with little success at first, no better than we had with the dental law. We probably have as good a law as New York. I have been twenty-five years in official life, and we have made a great change in the number of quacks in New Jersey in that period. I recognize that it is an utter impossibility to stop all of them. We have neither the money nor the time to spend in dental legislation and in the courts, but we are doing good work, and I think the time will come when quackery in its most glaring forms will be abolished. As the practitioners who are employed in these dental parlors become better educated, they will become more ethical. Their environments will be better; it is only a question of time. Did you ever stop to think if every one in the community who was not a dentist required dental work, there would not be one-fifth enough dentists to do it? So in that I look for the coming good of dentistry in an ethical way. If the young students who graduate (and there were forty-five hundred or more last year) do not make a living, the colleges will have to suffer. They will not go to the colleges.

Dr. J. H. HANNING. I would like to call attention to one point in which the law does not prevent quackery altogether; it deals only with the operator, the man at the chair, and not with his employer. In many of these so-called "parlors" the manager is not a dentist. He is there to make money. The price list is advertised, and the fish come in there for that bait. The purpose is to make as much money as possible, and the idea is to do a large amount of work, rather than good work.

Dr. KINGSLEY. When counsel is retained in a case he does not usually attempt to argue both sides. If he does, he fails to accomplish anything. When I took this subject I was hesitating somewhat which side I would present. I got a note from your president, asking who I would like to open the discussion. I named Dr. Jarvie, for I knew he could take the other side most admirably. I said I did not see the outcome. I said that to let some one else find the answer. It is not immediate, but with the system of demanding a higher education of those who enter the colleges, and not permitting any one to register or practice unless he has had such an education as is now required, the result may be attained; but it will take some little time. There will be no more quacks in dentistry than in the law or any other profession.

In some foreign countries the dentist has no standing at all. You cannot afford to be known as a dentist in certain circles. I should like to see that pass away. The community is beginning to realize that the dental profession is an educated one, according to Dr. Jarvie, and perhaps he is correct.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

INSTITUTE OF DENTAL PEDAGOGICS.

(Continued from page 482.)

DR. A. E. WEBSTER, of Toronto, Canada, read a paper entitled "Dental Pedagogics," which is printed in full at page 507 of the current number. After reading the paper, he illustrated his method of teaching by blackboard exercises.

Discussion.

Dr. C. N. JOHNSON. Having in mind very vividly the resolution of Dr. Hunt at the beginning of this session, and having respect for the Publication Committee of last year, whereby an intimation was made that all discussions be prepared in advance, and, as I understood it, written out, to the end that there would be as little time wasted as possible, I have ventured to do something I have never done before. I have written out my discussion.

For scope, breadth, and a general grasp of the subject the paper we have just listened to seems to me the most comprehensive of any we have ever had presented to dental teachers. It is a paper that cannot carry its full significance home to the association by a single reading. It must be studied when in print to get the most out of it, and even then there are some of its features which are so much in advance of contemporaneous thought on the subject among dental college teachers that I predict it will take years before its full significance is appreciated by everybody. A higher compliment to the essayist than this I cannot find words to convey.

The science of teaching how to teach is almost a new one to dental teachers, and it is surely time that some attention was given this subject. We are not doing our full duty to our students unless we give them the most and best that can be given them in the allotted time.

The two prime divisions of his subject seem to be the methodology and the psychology. I am a firm believer in method, but I have not yet grown to the idea that a uniform method can be taught to all teachers, or that it would be productive of the best results if it could. To carry this idea too far would be to make mere machines out of our teachers, and destroy the sublime soul of individuality. After all, it is largely the personality of the man that brings conviction home to the student, and, as the essayist has so truly intimated, no man need expect to excel as a teacher unless he be in the closest possible sympathy with his class. There is a science to teaching almost entirely distinct from other kinds of ability, and to be an able practitioner does not necessarily carry with it the equipment to teach.

The prime requisite of a teacher, as I look upon it, is the ability to stimulate thought on the part of the student and develop his reasoning faculties. So soon as you have started a student to thinking seriously on a subject, so soon have you attained the greatest measure of accomplishment toward its understanding. To this end no teaching is effective which is done in a perfunctory, cut-and-dried manner. Written lectures are simply an abomination and an offense to an intelligent class. The only aid in the lecture-room, aside from the illustrative accessories, should be confined to headings of subjects, and this merely to render the work orderly and systematic. To this end a teacher should be saturated with his subject, and no man who aspires to teach should be devoid of this qualification. It requires the eye to eye contact with the class to make teaching most effective. The sparks must fly from teacher to student, and from student to teacher, till both are keyed up to the highest pitch; and not till you attain this exalted condition are you doing the greatest good to your class.

Along this line, I am rapidly forcing into disfavor the practice of taking notes of lectures on the part of the students; at least in the presentation of my own particular subject, operative dentistry. I aim to stimulate my students to think, and if there is anything I abominate in college work it is the idea of students learning a thing by rote and repeating it like a parrot. The taking of notes interferes with the uninterrupted attention of both student and teacher. The moment you lose a student's eye, that moment half your force of conviction is gone. To uniformly hold the attention of a class, the manner of presenting a subject must be varied; it occasionally must be varied many times in the same lecture. And in this connection the plan of having stenographic reports made of lectures has always seemed to me objectionable. The lecture which reads well when reported is not always the most beneficial to a class, and *per contra* the lecture which carries conviction home to a class and leaves its indelible impress upon their minds would not by any means furnish smooth reading.

The psychological feature of teaching has more and more an absorbing interest to me, and I have always considered it the most fascinating phase of this subject; but the essayist has so ably touched upon it that I do not consider further elaboration necessary.

To sum up briefly, I believe that to be a successful teacher a man must first of all be in love with his profession; then with his special work as a teacher, and last, and to my mind most important of all, he must be in love with his students. He cannot do the most effective and permanent work without that bond of affectionate sympathy which the essayist referred to, where both teacher and student are working in harmony to get the most out of a college course.

I am also convinced that the element of personal integrity and sound morality enters largely into the question, for I am forced to believe that unless a teacher is built up of the purest moral fiber himself he will fail to impart that particular element to his work which makes most for the best development of his students. This view of the case gives us the most exalted sense of our responsibility as teachers, and if a man have not this in his heart he would better abandon teaching. We should also lose sight of the narrow conception which leads us to look upon this question of dental college teaching as it affects only ourselves and our students. The greatest result of our efforts relates not to the influence upon classes under our immediate instruction, but to the influence they carry with them out into the world and impart to their patrons. It is this double projection of our work that should demand of us the closest attention and the most painstaking effort.

Dr. A. H. Thompson. This question interests me deeply, and I think it is interesting and important to all; but there is one thing I think the paper missed, and also the discussion of Dr. Johnson, and that is the vital element of enthusiasm. It seems to me the one vital element of success in teaching is enthusiasm. In my little field I have often been impressed by the apparent amusement of some of the scholars by the enthusiasm that I would throw into the subject, but I take it as a good sign that they were impressed with the fact that I was enthusiastic. Enthusiasm becomes contagious. That is an important point.

Dr. H. A. Smith. I want to take back some things I said this morning if we are going to have papers like this and this kind of discussion; I don't care whether it comes from the Faculties Association or any other body. In this little side talk of the essayist about asking questions I noticed how he put them. It is a very important matter, and his method is simply admirable. He didn't say "Dr. Hunt" first and then put the question, but he put the question first and then called upon Dr. Hunt to answer it; and it makes a great difference whether you adopt that method or not. It has been suggested before, and I try to adopt this method, but I am so firmly fixed in the other that I forget about it half the time. The students are not half awake, you know, and when I put the question, calling first the name, the other fellows go to sleep; so you see the advantage of this method.

The essayist seems opposed in toto to the method of reading lectures. Of course he is correct, and that reminds me of a remark of Dr. Black a year or two ago. We were talking about teaching methods in dental colleges, and he said, "So far as reading lectures is concerned, I have abandoned all that, and each year I burn everything I had the year before, notes and all. I throw them away bodily, except some few things in the way of data and tables. I just burn the bridges behind me." I think that is the true teaching method. If you don't know the subject thoroughly, study it before you go into the class. Be full of it, as Dr. Johnson says; "be imbued with your subject." The manner of asking questions is important, and then you have something that you never had before in a paper on that particular subject.

I would like to know how they do it in Philadelphia.

Dr. E. T. Darby. I don't like to have the subject passed without a word or two of commendation for the valuable paper. There are many points in it that are extremely valuable.

I cannot agree with Dr. Smith that a man ought to destroy everything of the preceding year. I have been twenty-five years getting together my notes. I hope you will not think they are all twenty-five years old; that is, that my teaching is twenty-five years old. But there are many things that would slip a man's memory in the matter to be presented to a class unless it was tabulated and arranged in an orderly way. I have before me my book of notes, and sometimes I refer to it once or twice, perhaps three times, during a lecture; sometimes half a dozen times, because without it there is a possibility that I may overlook some important matter that will pass my memory at the time and might occur to me after the lecture was over. It refreshes my memory upon some important fact in connection with what I am endeavoring to teach. So I think notes are useful. But, as has been said, written lectures before a class of intelligent students or not intelligent would be an abomination. I can conceive of nothing more prosy than to sit and listen to a written lecture, but the personality of the lecturer would have a great deal to do perhaps with its being tolerated; some men read remarkably well. I have listened to written sermons that were a great deal better than oral ones, and I have thought sometimes a man would read his sermon better than preach extemporaneously. But I think to sit seven, eight, or nine months and listen to descriptions of filling and treating teeth, of orthodontia, or prosthetic dentistry in any form, a written description would be almost intolerable. I believe there are some teachers in our dental schools who choose that method in preference to the extemporaneous method of speech.

I have been exceedingly interested in what Dr. Webster has done in the past, and I am pleased to bear testimony to the superior way in which he presented the subject this afternoon.

Dr. WEBSTER. I wish to thank the gentlemen who have spoken such kind words of commendation in this connection, and just want to say that the particular methods that might come out in any teaching was not in the paper at all. That was not the intention. The idea was pedagogics, and that, of course, includes psychology and pedagogics in general. The matter of questioning, for instance, might come up, and the matter of taking notes. There should be something given on that subject. As to taking notes, an abundance might be said on either side, and on the subject of questioning also. Hughes writes a whole work of probably four hundred pages on the subject of asking questions, and that might be taken up very profitably. He also writes on the subject of attention; how to gain and maintain attention, a very admirable work. These are all subservient to the general principle.

As to notes, I am a firm believer that notes are an abomination. In my own work I ask the students to put the notes behind them. In fact, I tell them I don't want notes at all, or any study on the subject at home. They may think about it, but I don't want them to go home and read notes. I feel that if I can't pound it into them there, there is something wrong. It is really what they carry away in their minds that is of importance, and not what they carry away in their note-books.

Dr. C. S. CASE, of Chicago, Ill., read a paper entitled "Orthopedic Technics," which is printed in full at page 535 of the current number. Before commencing to read the paper, Dr. Case passed around among those present a card to which were attached different specimens of bands and wires, to which he referred in his address.

Discussion.

Dr. S. H. GUILFORD. I have nothing but commendation for the work and the paper of Dr. Case. I see the advantage here of having some one who gives his exclusive time to work of this kind in the dental college. In our Eastern colleges I believe this has not been the case. The matter has rested upon the one who taught operative dentistry, and I feel sufficient time has not been given to it. On the other hand, there is the danger of carrying the matter too far. Dr. Case anticipated that objection in the early part of his paper, that the question might arise as to whether we were giving too much attention to it. I don't think we can give too much attention to principles, but I think, with our present courses, we are apt to give too much attention to detail. While his work and drawings are very admirable, it seems to me some of them can be dispensed with. If I were to undertake to do that in my college the students would have to give four months to it, or two half-days each week for four months. The question is whether we could do it and give them time enough for the other work. As to making taps and dies, the students in the different colleges of Philadelphia have simplified that very much. That is to say, we can buy from the manufacturer square wire made of German silver, any size wanted, correctly made, in full lengths, or cut up into suitable sizes for nuts. Some years ago I went to a manufacturer in this city, and he made me partially prepared nuts. From a solid piece of wire the nuts are made of different lengths, and we save the necessity in that way of stamping out of solid nickel what we can get ready-made.

In regard to the die and die plate, Dr. Case has done very commendable work, and of which I have heard for the first time to-day, of having plates made of uniform sizes. I have realized the difficulty of drawing down wire to a correct size. There are not enough holes in the draw-plate, and they are not correctly gauged. We have obviated that difficulty, as Dr. Case has also, by taking No. 8 or No. 9 German silver wire, having it annealed, and then drawn through a draw-plate. Mine came from Cleveland, and we find it a very excellent thing. We have it in the college ready for use at any time. Before we draw we see that the wire shall be the same size as one of the standard holes of the draw-plate, but when the new draw-plate is out it will be a great improvement upon that.

The point I want to make is this, that with regard to making the nuts we have simplified that by having them partly made for us. Dr. Case uses three sizes of screws; Dr. Angle has two sizes. I have found in my work that one size is generally the proper size. It answers my purpose; so that we confine ourselves to one. To the same man who furnishes the wire I took a pattern I had, and he made this die, which he sells at about a dollar and a quarter. There is but one size, but it is the most perfect in the world. It is made like a machinist's die they use for cutting threads. I presume the most of you are familiar with it, but if I had anticipated this coming up this morning I would have brought some of them with me. By taking away some of the roughest work, I believe in their drawing down the wire; they have to do that. But when it comes to stamping out nuts and work of that kind, I believe the time can be more profitably spent in other ways. So I feel that much of the work should be done by some one outside, and that the finer work should be left for the students to do. By combining the two you save the students time and get the same result. In my experience I cannot recall a case where I have needed more than one size of screw and nut, different sizes and different lengths, but one gauge.

The plan and details of Dr. Case for orthodontia technic is very admirable. It is much fuller than anything else we have ever had on the subject, and I am obliged to him, for it will help me and others. I don't propose to copy it in its entirety, but I propose to get some valuable ideas from it. One of the things that appeals to me is the idea of getting up a draw-plate gauge-plate that will enable us to do our work better than we have done.

Dr. T. E. Weeks. While I do not teach orthodontia, I am somewhat familiar with the plan that is practiced by Dr. Weisse, and I feel rather familiar with Dr. Case's ideas, for the reason that through our intimate friendship I have probably obtained more of his ideas than I otherwise would have done; but I want to say a word in regard to the presentation of this technic. I think we cannot thank Dr. Case too much, for it is very complete. His idea was to give a full presentation of the whole subject of orthodontia technic, and it is in harmony with the ideas of the men who have presented syllabi and outlines of their branches of technic, that they would be complete, and thus enable teachers to select such as could be applied to advantage in their own work. And I think we ought to make an effort to keep this in mind all the time. In our association I have noticed a tendency to interpret what was rendered as being urged for all. I am not certain that Dr. Case's idea was in entire harmony with the other lines that have been presented, but it was a very full presentation for the express purpose of giving every one an opportunity to select. It seems to me that what we should endeavor to get out of these presentations is to select a course that will include the best, and let that course be adapted to our own individual needs.

Dr. G. H. Wilson. It seems to me we are apt to look at this work as something more than the rest of us are able to accomplish. We know Dr. Case has accomplished it, but why? Simply because the work has been systematized; and that is the real aim of our association. This work is put into the hands of a man whose business it is to teach this. He is given a certain amount of time, and he should develop it to the very highest point possible. That is what Dr. Case has done. You can see what is possible when it is systematized. The amount of time given this work is no more than the subject demands, but, at the same time, it is making the best use of the time. So I believe that the lesson for us to learn to-day is to systematize our work, and then more can be accomplished in the time at our disposal.

As to having material prepared for us, to a certain extent I don't believe it is the best thing. I believe the more manipulative work we can compel our students to do, the better it is. We want to learn to use our hands. We had a fine demonstration of that last night. If we as dentists could use our hands as we saw the young men do it I believe it would be a great benefit, and that is only accomplished by repetition. So the more we compel our students to do, the less time they will have to spend in the smoking-room.

Dr. J. G. Templeton. I have heard lectures given by Dr. Case quite a number of times, but never before saw him illustrate anything in regard to the technics of orthodontia. There was one thing he mentioned that I was very much pleased to hear, and that is in reference to obtaining a knowledge of physics as a preliminary qualification to this work. The knowledge of physics, so far as the law of force is concerned, is a very great advantage in all prosthetic work; particularly so with regard to this work. By having this knowledge of physics a person understands where to apply the force, and where the force will come by using these appliances.

Dr. N. S. HOFF. It seems to me that the presentation we have had this morning will make us realize more and more the necessity for this organization. Although I have known considerably about the work which Dr. Case has been doing, I have not had a proper conception of the method he has employed in instructing his students; and the thoroughness with which he has gone into the details gives me some idea of the value and necessity for a complete presentation of this work in orthodontia technic. We have never before had anything like an adequate presentation of this matter to us, and it only serves as a beginning. Dr. Case in this presentation has given us only one method. There are other methods, and these will in due time be presented to us, and by and by we shall crystallize these different ideas into a complete system. It is again evident that our work is not done. We here have only the beginning in this particular department. Many have thought there was not enough to keep up interest in this association in years to come. Here we are starting out on a new subject which has been clearly presented, and only one phase of it has been shown. Dr. Case has not even suggested the technic of the application of the appliances that he has shown us for the accomplishment of the purpose for which it is intended. There is a technic in the application of appliances which we must have to give to our students; how this material is to be utilized in correcting irregularities. Some day we will get down to fundamental principles in that respect. There is an opportunity for enlarging this work, it seems to me, of which we can hardly see the end. It would occupy our whole time for perhaps a week to discuss this one part of our work. I feel that we are greatly indebted to Dr. Case for so ably presenting to us such a complete system as he has here presented for this part of our work. I hope next year we may have a further presentation, including also other methods.

I am very much interested in this particular line of work. In our school we teach it, but not to the extent shown here, which I hope we may do and make our teaching in this subject more systematic than it has been. We teach other methods; none of them are complete or satisfactory. When we get a presentation from other specialists who are doing the same work by other methods and means, as fully as this has been, by bringing them together we shall have a complete system of the means used for this purpose. I don't think we could have a better basis for our work than the one that has been presented here this morning. I want not only to compliment Dr. Case for the manner of the presentation, but to thank him cordially for the thoroughness with which he has done it. He has gone to great pains to present the matter with all this detail, and I am sure we owe him our best thanks for it.

Dr. W. H. WHITSLAR. The argument presented by Dr. Guilford as to having students buy material is one I think not quite correct, for the reason that about fifty per cent. of the students will go into the country to practice, or in country towns where this material cannot be purchased, and it is necessary for them to be competent or able to prepare their own material to work with. Often they do not have the means to communicate with merchants in large cities, and don't know where to buy these materials. For that reason I think it is advisable for them to prepare these different instruments, wires, nuts, and so on, for themselves.

Dr. H. J. GOSLEE. I am quite familiar with Dr. Case's system of technic work, having had the honor of being his associate for three or four years, and I cannot resist the temptation of adding a few words of approval of the outline he has presented to us here to-day. When I think back only three or four years, and see the results we got from our students at that time and compare them with those we get to-day, it is almost astonishing to see the improvement. That improvement has been gradually made by time, thought, and study. It has been worked out carefully by Dr. Case, with results that are better by far than they were then; and this result is due largely to the fact that the students have been required to make these appliances themselves. At the time I speak of, three or four years ago, we permitted them to buy the tubing ready-made; buy the wire, the taps, supposed to be of the proper size, buy anything they could that would answer the purpose. Those students when they got through didn't know anything about regulating or the construction of regulating appliances as compared to the boys of to-day. We all appreciate, I am sure, the manual training that the construction and preparation of these various materials must give the students. We all appreciate the value that it is to them. Dr. Guilford said he did not think we had time enough to present this subject as thoroughly as Dr. Case has outlined it. I would like to say that it does not consume a great deal of time. I dare say we do not devote much more time to this work in our school than Dr. Guilford does in his, but it is so thoroughly systematized more can be accomplished. Two afternoons a week for four months is not a great deal of time, and I am pretty sure the average curriculum of the average college could find plenty of opportunity to give to orthodontia technic that much time.

About dies for nuts, Dr. Case has brought them to a system of perfection and simplicity, and that has been a stumbling block in working out the system he presents; but we have found a steel die that will cut four nuts at once a success. Four or five minutes will finish a nut, stamp, cut it out, and thread it. When you have a systematic method the time consumed is not nearly so great as might appear from the time occupied in presenting the subject.

Dr. S. H. GUILFORD. I think Dr. Whitslar and some others have misunderstood what I said. I am an advocate of students preparing their own material. The only point I made is in the kind of material. I mean the matter of making nuts, which is one of the most difficult things they have to do. If they have a die it can be done, but if each student has a die it will add to the expense of the equipment. The wire cost almost nothing, and it don't help the student much to make that wire.

Dr. H. P. Carlton. Dr. C. L. Goddard handed me a syllabus which he uses with the students of our school. Dr. Goddard gives his whole time to teaching these subjects. We have a complete course of this character. The syllabus follows:

As I cannot be present to take part in the discussion of the paper on orthodontia technic, I will offer the following description of how the subject is taught in the Dental Department of the University of California.

One lecture a week is given to the senior and junior students assembled together, and, in addition to this, the juniors are instructed in "technic" by my assistant, while the seniors treat practical cases throughout the year under my personal supervision.

By many it may be thought that lectures on this subject should be given to seniors only, but I find that they are better prepared for the practical cases of the senior year if they have listened to lectures during the junior year, and that they need a repetition of them to fix methods and appliances in their minds. The lectures are illustrated by drawings, lantern slides, and blackboard work.

The drawings of the teeth are made in black and white, but the appliances are drawn in different colors, as follows: Yellow representing gold or German silver; gray, platinum; blue, steel; dark red, vulcanite; green, soft rubber; pink, silk or linen ligatures, etc.

I think the subject is best illustrated by blackboard drawings, because the irregularity of the teeth can be first outlined in white, then the appliances added in colored chalk; and the construction thus clearly explained in its various stages.

For convenience of description and illustration, irregularities are divided into fifteen classes. The etiology of each class is explained with more or less minuteness, and authorities quoted.

Oral quizzes are held occasionally to review causes, plans, and theories. Quizzes on treatment are held as follows: The blackboard is covered before the lecture with drawings in colors, representing classified irregularities and various appliances for their treatment. These drawings are numbered, and students are called up in turn to point out and explain the irregularity and treatment. Students seem very much interested in these quizzes.

On one of the walls of the lecture room is a small cabinet, in which are placed, before each lecture, casts illustrating that lecture. These casts are left in this cabinet till the next lecture, for inspection.

The orthodontia technic work is conducted by my assistant, but under my directions, as follows: Each junior student is provided with a piece of No. 13 B. & S. gauge German silver wire and a piece of 23 plate. From these he is required to make all the prescribed appliances that can be constructed of that metal. Other metals or materials are provided when necessary.

He is required to roll out plate, draw wire, make tubing, both round and square, cut threads on wire, make a drill and tap, nuts, and a series of "partly-made" appliances. These are all placed on a card prepared for the purpose, and constitute the first set of appliances that can be used afterward in constructing a few typical ones that are fitted to and presented on plaster casts. Original models of a few typical cases are prepared by my assistant, from which students take impressions and make their own casts. The models and appliances required are varied somewhat each year.

In the senior year each student is required to treat at least one practical case of irregularity or deformity. Whenever possible, a cleft-palate case is assigned.

The superintendent of the infirmary assigns a patient to each student, who first fills out a blank descriptive of the case, takes impressions, and makes articulated casts of the upper and lower teeth. At a weekly clinic the patient is presented for my inspection and advice. After examination a drawing is made on a blackboard near the chair showing the irregularity in white; then the appliance prescribed is added in colored chalk, and described to the surrounding class. If the case presents any unusual features, a clinical lecture is given then and there. These short talks are very valuable in supplementing the regular didactic course, and the students' attention is called to many phases of eruption and changes in position of the teeth that cannot be shown except in the mouth or on the face of the patient.

The student in charge of the case in hand is instructed to make the prescribed appliance, place it on the patient's teeth, and present it at the next clinic. As soon as one case is thus disposed of, another is taken up in the same manner. The same patients are presented at subsequent clinics for inspection and advice until the correction is completed.

In a wall cabinet with a glass door, just behind the chair, all the original articulated casts are kept, so as to be readily compared with the patient at the clinics and progress noted. A record is kept of each inspection of the patient.

I want to say just a word about where the clinics are held. I use a chair that fronts a window and is beneath a skylight. There is room for quite a number of students to stand so as to see the case well without obstructing the light. Behind the chair is a wash-stand with running water, provided with soap, nail-brush, and clean towels. On one side of the stand is a blackboard with eraser and colored chalk. On the other is the cabinet with a glass door. Spaces are reserved for the casts made by each student, and the student's name placed in front of the shelf, so that any case can be found in a moment. In this cabinet are kept a few instruments and supplies that may be needed in the clinic.

When a case is completed and a retaining appliance in place, if necessary, the student presents articulated casts showing the teeth in their new position. He also makes a duplicate of the original model, and places on it the appliance used or a duplicate. These three casts are then fastened to a small board, and show successively the case as begun, in progress, and completed. In some cases additional casts are made to show different stages of treatment or changes in appliances.

In the exhibit presented for your inspection specimens of our junior students' technic and senior students' practical work are shown, as also copies of directions that are furnished each student before work is begun.

I regret that I cannot be present at this meeting to see the rest of the exhibit and hear the papers and discussions. I have much yet to learn, and feel that that is the place to learn it.

Dr. W. E. GRANT. I was glad to hear the paper and what Dr. Wilson has said as to the importance of one devoting his time to this work, and to the number of hours allotted to it. That is the keynote to all technic work, the amount we try to accomplish in the schools. When we come to consider the number of hours, Dr. Case, as I understand, gives ninety-six hours a session to this work, six hours a week for four months. Those of us who feel we could not give that much time could give seventy-two hours, or even fifty-four. In my school we now give fifty-four hours a session to orthodontia technic work. I find it is not only beneficial in giving manual training, but by varying it, that is, by assigning students to some piece or to phases of the work that represent the views of different authorities upon this subject, that they become familiar with the different men's ideas. For instance, I have them make some of the work that represents Case's idea; again, work that represents Angle, Jackson, Guilford, and others who have suggested some special appliances. It gives them a technique and an idea of the application of the different classes, and they get it in a better manner than I could possibly present it in demonstration or by didactic lectures.

Dr. C. S. CASE, in closing, said: I don't think there is anything more I need to say, except to thank you for the words of commendation that you have expressed for the work we do along this line.

In answer to the question relative to seamless tubing, I have had no experience with that, as we do not need it at all. The seams of all tubing are soldered next to the band, and the solder closes the seam. In other places, where the tubing is free, it is not necessary to have the seams closed. They never open if they are closed properly.

In regard to the construction of nuts, it has been for some time a stumbling block, although the method of making them of some solid material is far superior to anything else. You get the advantage of all the solid material in the strength of the threads of the nut. In fact, we have tried every method that has been used. The method that Dr. Guilford has spoken of has been tried by us. We have found that it does not favorably compare with the method of making them out of the solid material.

(To be continued.)

DENTAL SOCIETY OF THE STATE OF NEW YORK.

AT the annual meeting of the Dental Society of the State of New York, held at Albany, N. Y., May 9 and 10, 1900, the following officers were elected for the coming year: Dr. John I. Hart, New York, president; Dr. R. H. Hofheinz, Rochester, vice-president;

Dr. W. A. White, Phelps, secretary; Dr. C. W. Stainton, Buffalo, treasurer; Dr. H. D. Hatch, New York, correspondent.

The following resolutions, offered by Dr. R. Ottolengui, were unanimously adopted:

WHEREAS, An amendment to the constitution of the National Association to be acted upon at the next meeting provides for the admission of members recommended by local dental societies; and

WHEREAS, It is the sense of this association that, as the state societies should support and uphold the national organization, so reciprocally the national body should support and uphold the state societies; and

WHEREAS, The state society being the most important dental society of each state, men seeking admission into the National Association should be required to give their adherence to their state societies, whose recommendations should guarantee their fitness for the honor of membership in the national body, while men unwilling to join their state societies should not be acceptable to the National Association; therefore, be it

Resolved, That the New York State Society recommend to the national body that it should not adopt an amendment so inimical to the best interests of state societies; and be it

Resolved, The delegates and members of this society be instructed to oppose this amendment at the national meeting; and

Resolved, That these resolutions be transmitted by the secretary to the National Association for presentation to that body.

W. A. WHITE, *Secretary.*

SIXTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE thirty-second annual meeting of the Sixth District Dental Society was held at Binghamton, on May 2 and 3, 1900.

Three sessions were held, two at the Hotel Bennett, and one at the office of the secretary, which was devoted to clinics. All of the sessions were well attended, and the program furnished by the Business Committee called out some interesting discussions.

The annual reports of the treasurer and of the secretary showed the society to be in a very prosperous condition. Three new members were admitted to membership,—viz, John V. Flaherty, D.D.S., of Chittenango; Walter W. Barton, D.D.S., of Binghamton, and Fred A. Ford, D.D.S., of Cazenovia.

The officers elected were: Marcus O. Landon, Delhi, president; Francis M. Willis, Ithaca, vice-president; Frederic W. McCall, Binghamton, secretary; Herbert D. Whitmarsh, Binghamton, treasurer; Edwin D. Downs, Owego, censor.

The Business Committee was authorized to invite Dr. Edward C. Kirk, of Philadelphia, to give a clinic or deliver an address at the next annual meeting, to be held in Binghamton, in May, 1901.

It was decided to hold the next semi-annual meeting at Oneonta, N. Y., on October 3, 1900. FREDERIC W. MCCALL, *Sec'y.*

THIRD DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE above-named society held its annual meeting at Albany, April 17 and 18, 1900. The following were elected officers for the coming year: C. H. Bird, Troy, president; G. A. Sullivan, Albany, vice-president; M. J. Barrett, Troy, secretary; J. W. Canady, Albany, treasurer; F. LeGrand Ames, Albany, correspondent.

SEVENTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The thirty-second annual meeting of the Seventh District Dental Society of the State of New York was held at Rochester, April 24 and 25, 1900. The meeting was largely attended, and several good papers were read and discussed. Some of the papers are published in this number of the Dental Cosmos.

Six new members were added to the society during the session. The officers elected to serve during the ensuing year were as follows: C. H. Nicholson, president; W. W. Belcher, vice-president; F. Messerschmitt, recording secretary; F. W. Proseus, corresponding secretary; LeRoy Requa, treasurer.

The next meeting will be held in conjunction with the Eighth District Dental Society, at Buffalo, in October, 1900.

VERMONT STATE DENTAL SOCIETY.

At the twenty-fourth annual meeting of the Vermont State Dental Society, held at St. Johnsbury, March 21-23, 1900, the following officers were elected for the ensuing year: Dr. H. Turrill, Rutland, president; Dr. C. W. Steele, Barre, first vice-president; Dr. J. A. Pearsons, Barton, second vice-president; Dr. T. Mound, Rutland, recording secretary; Dr. Grace L. Bosworth, Rutland, corresponding secretary; Dr. W. H. Munsell, Wells River, treasurer; Dr. G. W. Hoffman, White River Junction, state prosecutor. Executive Committee, Dr. J. H. Jackson, Burlington; Dr. H. Burbridge, Woodstock; Dr. R. H. Newton, Montpelier. The next meeting will be held at Montpelier the third Wednesday in March, 1901. Thomas Mound, *Rec. Sec'y.*,
Rutland, Vt.

CHICAGO DENTAL SOCIETY.

Following are the officers of the Chicago Dental Society for 1900-1901, elected at the annual meeting, held in the Stewart Building, Tuesday evening, April 3, 1900: Geo. W. Cook, president; Geo. B. Perry, first vice-president; H. J. Goslee, second vice-president; Elgin Ma Whinney, secretary; C. S. Bigelow, corresponding secretary; A. B. Clark, treasurer; H. W. Sale, librarian; Edmund Noyes, member of Board of Directors. Board of Censors, W. V-B. Ames, chairman; C. N. Johnson, A. W. Harlan.

C. S. Bigelow, *Cor. Sec.*,
100 State street.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

AT the annual meeting of the Central Dental Association of Northern New Jersey the following officers were elected for the ensuing year: H. S. Sutphen, Newark, president; F. G. Gregory, Newark, vice-president; N. M. Chitterling, Bloomfield, secretary; Chas. A. Meeker, Newark, treasurer. Executive Committee, J. S. Vinson, Newark; F. L. Hindle, New Brunswick; C. W. Hoblitzell, Jersey City; J. W. Fisher, East Orange; P. G. Voegtlen, Madison.

NELSON M. CHITTERLING, *Sec'y.*

SOUTHERN MINNESOTA DENTAL SOCIETY.

THE annual meeting of the Southern Minnesota Dental Society was held in Mankato, April 11, 1900. Following are the officers elected for the ensuing year: F. S. James, Winona, president; C. A. Palmer, Luzerne, vice-president; A. C. Rosenquist, St. Peter, secretary; M. B. Wood, Mankato, treasurer.

The next annual meeting will be held in Mankato, April 9, 1901.

A. C. ROSENQUIST, *Sec'y.*

MISSISSIPPI STATE DENTAL ASSOCIATION.

FOLLOWING are the officers for the ensuing year: Dr. S. F. Carr, of Clarksdale, president; Dr. H. T. Stewart, of Greenville, vice-president; Dr. A. B. Kelly, of Yazoo City, secretary; Dr. J. E. Suber, of Crystal Springs, treasurer.

CHESTER AND DELAWARE COUNTY DENTAL SOCIETY.

THE Chester and Delaware County Dental Society held their annual meeting in January, at Media, Pa., and elected the following officers: Dr. Scott, president; Dr. Campbell, secretary; Dr. Smedley, treasurer; Dr. Shaler and Dr. Bernard, Executive Committee.

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DENTAL COLLEGE COMMENCEMENTS.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE forty-fourth annual commencement exercises of the Pennsylvania College of Dental Surgery were held in the Academy of Music, Philadelphia, Pa., on Wednesday evening, May 2, 1900.

The address to the graduates was delivered by Professor I. N. Broomell, D.D.S.

The number of matriculates for the session was three hundred and thirty-six.

The degree of D.D.S. was conferred on the following graduates by Hon. Samuel Gustine Thompson:

John Acron	Pennsylvania.
Paul R. Albanesius	New Jersey.
Benj. F. Anderson	Ontario.
Walker R. Arde	Canada.
Jas. W. Armstrong	Pennsylvania.
William Axford	Pennsylvania.
Charles A. Bachman	Pennsylvania.
Charles P. Bannan	Canada.
G. W. Barnhard, Jr.	Pennsylvania.
M. F. Bley-Lehmann	Austria.
Loring R. Beardsley	Canada.
David V. Besser	Pennsylvania.
Arthur L. Blackburn	Pennsylvania.
Wm. A. Blackburn	Ohio.
W. H. Bonsall, Jr.	Pennsylvania.
George M. Boone	Pennsylvania.
Eugene W. Boyer	Pennsylvania.
Coy M. Bugbee	Vermont.
Frank M. Cæsar	Canada.
Sherman L. Carroll	Pennsylvania.
Joseph C. Courtney	Pennsylvania.
Elvin D. Chipp	New York.
Glenn E. Coe	New York.
Walter S. Cole	Ontario.
Harold I. Cragin	New Jersey.
George E. Creasey	Pennsylvania.
J. H. Crist	Pennsylvania.
Alfred B. Crowe	New York.
Froilan R. Cespedes	Cuba.
Erle C. Curtis	Quebec.
Henry T. Danforth	Oregon.
Joseph M. Danneker	Pennsylvania.
R. S. De Long	Pennsylvania.
J. M. De Coursey	Maryland.
Iglesias R. Gonzales	Cuba.
Augustus C. Foster	New Hampshire.
Hartley C. Foster	California.
Edward E. Foust	Pennsylvania.
J. D. Frisbee	New York.
Charles M. Gass	Pennsylvania.
James H. Gladstone	New York.
John C. Grant	Nova Scotia.
Walter L. Grier	Delaware.
William L. J. Griffin	Pennsylvania.
Frank G. Gulliland	Massachusetts.
Harry I. Haines	Pennsylvania.
Frank S. Hall	Delaware.
Warren F. Harrer	Pennsylvania.
Hugh M. Haslett	Pennsylvania.
D. M. Hawke	Pennsylvania.
B. F. Henchey	New York.
Alejandro H. Hijo	Santo Domingo.
Wilson A. Henry	Pennsylvania.
Frank Herman	Pennsylvania.
H. C. Hespe	New Jersey.
Charles H. S. Hicks	Massachusetts.
William J. Hopkins	Pennsylvania.
Bertram F. Holden	New Jersey.
Geo. M. Hutchison	Pennsylvania.
Alfred C. Hills	Massachusetts.
A. L. Hyzer	New York.
Charles Innes	New York.
Edward W. Jarvis	Connecticut.
Paul Jones	Pennsylvania.
John T. James	Pennsylvania.
Cortland E. Jennings	New York.
Harry Jerzy	Louisiana.
Alfred I. Keys	Pennsylvania.
Jane L. Kift	Pennsylvania.
Henry J. Kraft	Pennsylvania.
D. G. Knecht	Pennsylvania.
Henri E. Langis	Quebec.
John J. MacAleely	Pennsylvania.
Daniel McClarty	New York.
John McAllister, Jr.	Pennsylvania.
Herbert A. McCrea	Quebec.
Hiram A. McIntosh	Canada.
Harold H. Messimer	Pennsylvania.
D. S. Miller	Pennsylvania.
Robert W. Miller	Ohio.
Ellsworth J. Mills	Pennsylvania.
Ross W. Mills	Canada.
H. L. Mitchener	Nova Scotia.
Bernard Mindling	New York.
H. E. Morris	Nova Scotia.
Joseph P. Morrison	Pennsylvania.
Wm. C. Neümuller	Pennsylvania.
L. M. Nugent	Pennsylvania.
Howard C. Nyce	Pennsylvania.
J. G. Petrie	New Jersey.
Mary A. Quigley	Pennsylvania.
Ernesto S. Quesada	Costa Rica.
Herbert A. Rice	Pennsylvania.
Isador Revnes	Russia.
Delia Riggs	New York.
Louis Rubman	New York.
John D. Sutphen	Ohio.
G. A. Savage	Massachusetts.
Orrin J. Shaw	Maine.
J. F. Shields	Pennsylvania.
Moses Silberman	Pennsylvania.
S. R. R. Smith	New York.
Thos. H. Smith	Canada.
Munro C. Snyder	Pennsylvania.
Jacob P. Snyder	Pennsylvania.
Jos. G. Sokolowsky	Russia.
E. A. Starkweather	Pennsylvania.
Thomas F. Stratford	Pennsylvania.
Albert W. Strecker	Pennsylvania.
Daniel B. Suttle	Canada.
Irving E. Strong	Connecticut.
Harold Sutton	New York.
W. A. Thome	Missouri.
R. H. Till	Canada.
Arthur B. Teakles	Canada.
Arthur P. Thorp	England.
Victor A. Vores	Connecticut.
Const. N. Veltakys	Greece.
Lee O. Waller	Delaware.
R. J. Warrick, Jr.	Pennsylvania.
Albert F. Wayne	Pennsylvania.
Joseph C. Wiltbank	Delaware.
Taylor T. Woollens	Pennsylvania.
Fred L. Weed	Pennsylvania.
Warren L. Zane	New Jersey.

MILWAUKEE MEDICAL COLLEGE, DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of the Milwaukee Medical College were held in the Pabst Theater, Milwaukee, Wis., on Tuesday, April 3, 1900.

The number of matriculates for the session was one hundred and fifty-three.

The degree of D.D.S. was conferred on the following graduates by George V. I. Brown, D.D.S., M.D., C.M., dean:

Denver W. Babcock	Wisconsin.
Arthur J. Bibinger	Wisconsin.
Leonard W. Booth	Wisconsin.
Paul J. Brunow	Wisconsin
John F. Crowley	Illinois.
Edwin A. Dean	Wisconsin.
Robert H. DeLap	Wisconsin.
Frederick W. Druse	Wisconsin.
Alexander Ewart	Wisconsin
Matthew N. Federspiel	Wisconsin.
George H. Frank	Wisconsin.
Bertis . Frazey	Iowa.
Rudolph C. Gruettner	Wisconsin.
William A. Harrod	Iowa.
Ivan I. Hensel	Wisconsin.
Edgar L. Hoag	Wisconsin.
George H. Holliday	Wisconsin.
Edward H. Kloehn	Wisconsin.
John W. Leonard	Wisconsin.
John B. Lyke	Wisconsin.
William E. Lyons	Wisconsin.
Harry C. Morris	Wisconsin.
Fred A. Mueller	Wisconsin.
Albert M. Nehs	Wisconsin.
Claire M. Olson	Wisconsin.
Francis L. O'Neil	Wisconsin.
Ernest C. Oviatt	Wisconsin.
Thomas A. Purtell	Wisconsin.
Chauncy E. Richards	Wisconsin.
Charles T. Rosenbaum	Wisconsin.
Urvin F. Schlafer	Wisconsin.
William C. Trezona	Wisconsin.
Albert J. Vits	Wisconsin.
Herman A. Wagner	Wisconsin.
Gilbert I. Wenker	Wisconsin.

BIRMINGHAM DENTAL COLLEGE.

The annual commencement exercises of the Birmingham Dental College were held in the Jefferson Theater, Birmingham, Ala., on Thursday evening, April 26, 1900.

The address to the graduating class was delivered by Hon. J. H. Miller, of Birmingham.

The number of matriculates for the session was forty-one.

The degree of D.D.S. was conferred upon the following graduates by T. M. Allen, D.D.S., dean:

J. R. Cofield	Alabama.
E. A. Lang	Arkansas.
G. H. Maxwell	Alabama.
W. W. McTyeire	Alabama.
A. J. Murphy	Mississippi.
J. K. Thompson	Arkansas.
T. J. Walton	Mississippi.
J. A. White	Alabama.
W. P. Wilson	Alabama.
A. A. Wafford	Mississippi.

PHILADELPHIA DENTAL COLLEGE.

The thirty-seventh annual commencement exercises of the Philadelphia Dental College were held in the Academy of Music, Philadelphia, on Friday evening, May 4, 1900.

The number of matriculates for the session was three hundred and eighty-nine.

The address to the graduates was delivered by Professor T. C. Stellwagen, M.A., M.D., D.D.S., and the valedictory by Charles L. Campbell, D.D.S.

The degree of D.D.S. was conferred on the following graduates by ex-Governor James A. Beaver, president of the board of trustees:

Albert J. Anthony	Pennsylvania.
J. A. Baab	New York.
Harry H. Babb	Pennsylvania.
Clarence N. Barker	New York.
Ulysses G. Bartlett	California.
Olivia E. Berg	Sweden.
Frank S. Bird	New Jersey.
Matt. H. Boehmer	Wisconsin.
Albert G. Bradburn	New York.
Fred. A. Brill	Pennsylvania.
Charles S. Burt	Vermont.
Chas. L. Campbell	Pennsylvania.
Edgar Chater	England.
Raymond S. Clarke	New York.
George Collison	Delaware.
Harry D. Conn	Ohio.
E. S. Cummings	New Hampshire.
John B. Douglas	New York.
Wm. H. Fallon	Massachusetts.
Jacob S. Feldman	Roumania.
Cecelia Feinberg	New York.
Julian F. Flaig	Pennsylvania.
Hermon A. Fordyce	Canada.
Fred. A. B. Forrest	Connecticut.
W. W. Fritz, M.D.	Pennsylvania.
Estella A. Gamble	California.
Norman L. Gartley	Canada.
Angus C. Gray	Pennsylvania.
Marion L. Gray	Missouri.
A. G. Hamilton	Pennsylvania.
Alfred Hewish	Canada.
Wm. S. Hewitt	New Jersey.
Ralph S. Higgins	Maine.
L. G. Hofmeyer, Ph. G.	Germany.
M. C. Holbrook	Oregon.
Chas. P. Holland	California.
L. P. Hughes	Maine.
Wm. H. Johnson	Pennsylvania.
Thos. W. Kelly	Pennsylvania.
R. T. Kenyon	New York.
Gab. Lewkowicz	France.
Henri Lewkowicz	France.
Izidor Lewkowicz	France.
Wm. T. S. Lindsay	Canada.
Thos. H. Litz	Pennsylvania.
S. S. Lottridge	New York.
Oscar E. Lynott	Missouri.
James P. Maney	New York.
F. L. Manning, B.S.	New Jersey.
David Manson	Vermont.
Chas. A. Meikle	New York.
E. H. Mentzer	Pennsylvania.
John S. Monks	Pennsylvania.
John F. Mullins	Massachusetts.
W. L. Muspratt	Pennsylvania.
Chas. W. McBride	Canada.
J. C. McCrillis	Maine.
A. J. McDonald	Canada.
Frank C. McElroy	Rhode Island.
C. B. McManus	Canada.
Jas. F. McNally	Rhode Island.
C. A. Newman	Australia.
Jas. H. O'Brion	Maine.
Wm. A. Ogden	New York.
Fred. O. Orcutt	Maine.
Frank Paddock	Indiana.
Wm. H. Parks	Canada.
Clayton J. Peebles	Pennsylvania.
N. S. Phillips	Canada.
Wilbur J. Pratt	Canada.
Michael F. Quinn	Rhode Island.
Wm. B. Reeve	Canada.
Jas. B. Reynolds	Pennsylvania.
J. A. Richardson, Ph.G	New York.
Herman A. Ritchie	Pennsylvania.
C. W. Roberts, Ph.G	Connecticut.
Jos. S. Roberts	Illinois.
W. H. Robinson	Connecticut.
John F. Roche	Massachusetts.
Geo. E. Rowell	New Hampshire.
Alice E. Russell	New York.
José Saenz	Bolivia, S. A.
C. C. Saunders	West Virginia.
L. Y. Schermerhorn	New York.
John Scott	Canada.
A. J. Seeler, Ph.G.	Pennsylvania.
Wm. C. Shipman	Pennsylvania.
Jno. H. Smathers	North Carolina.
Harry W. Solt	Pennsylvania.
Geo. F. Stearns	Connecticut.
Artin der Stepanian	Turkey.
Clyde H. Stocking	California.
S. O. Storck	New York.
Annie Stuart	Canada.
Jno. L. Sullivan	Connecticut.
Oscar S. Svenson	Sweden.
Will S. Tarr	California.
Earl A. Teets	West Virginia.
C. B. Thompson	Canada.
Walter E. Walsh	California.
Mary L. Warren	Connecticut.
Chas. F. Wassem	Pennsylvania.
Blythe R. White	Pennsylvania.
Wm. A. Young	New Hampshire.
Wilbur W. Young	Maine.

OHIO MEDICAL UNIVERSITY, DENTAL DEPARTMENT.

THE eighth annual commencement exercises of the Dental Department of Ohio Medical University were held at the Great Southern Opera House, Columbus, Ohio, on Tuesday evening, April 24, 1900.

The number of matriculates for the session was one hundred and eighty-three.

The degree of D.D.S. was conferred upon the following graduates:

Deverne Abbott.
Willis A. S. Barber.
Leroy C. Benedict.
Lindsey R. Brookins.
Harvey V. D. Cottrell.
Elias O. Dennis.
Mina B. Dunlap.
William H. Dillon.
John C. Early.
Joseph C. Evans.
Stanley W. Eakin.
Clyde S. Fergus.
Clare L. Frame.
William H. Gobey.
George L. Gordon.
J. W. Hartshorn.
George S. Hershey.
Albert L. Hagerty.
William J. Keyes.
Sophia H. Kimball.
Ora B. Kneisly.
Charles D. Krim.
James O. Lathem.
Perlie H. Leffel.
Benj. F. McGinnis.
George E. Morden.
Wm. H. Mundwiler, Jr.
Wilbur H. Munger.
Lee H. D. O'Grady.
Wm. F. Pasters.
Lester W. Paullin.
William E. Rickel.
Robert U. Rose.
Chas. A. Ruhlen.
William E. Shadrach.
Clark G. Smith.
Charles K. Teter.
Elmer D. Wilson.
William G. Wirt.
George C. Woods.
Norvill F. Young.
Emanuel R. Zimmer.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

THE annual commencement exercises of the Royal College of Dental Surgeons of Ontario were held in the Y. W. C. Guild Hall, Toronto, on Friday, April 27, 1900.

The doctorate address was delivered by Dr. C. N. Johnson, of Chicago.

The number of matriculates for the session was one hundred and sixty-six.

Degrees were conferred by Dr. A. M. Clark, president of the board of directors, on the following graduates, all of the Province of Ontario, Canada:

Wilmor B. Amy.
Thos. B. Armstrong.
Robert M. Armstrong.
James R. Atkinson.
Earl S. Barker.
S. H. Bartlam.
Gerald C. Bonnycastle.
Frank C. H. Briggs.
Albert J. Broughton.
John V. Budge.
Herbert Colborne.
Edward C. Campbell.
Oscar I. Cunningham.
Benj. J. Curry.
Albert B. C. Dando.
Louis Doering.
Wilkinson F. Elliott.
Chas. W. Ellis.
Edward M. Ely.
Chas. A. Fitzpatrick.
Stanley T. Floyd.
Douglas M. Foster.
Thos. E. Gallaugher.
Edgar L. Gausby.
James W. Gray.
William J. Gunn.
Chas. A. Harding.
Geo. M. Hermiston.
Wm. T. Holloway.
E. W. Honsinger.
Gershom P. Howard.
Henry J. Hudson.
James S. Island.
Roland Jarvis.
Edwin C. Jones.
James H. Kelsey.
Stephen M. Kennedy.
Loftus T. Kennedy.
Stewart Lockridge.
Fred. R. Mallory.
John S. Miller.
Allan C. Michell.
J. M. Mitchell.
Fred. P. Moore.
Edward W. Moles.
Wm. A. McDowell.
John M. McFarlane.
Thos. N. McGill.
Allan W. McGregor.
Herman McLellan.
James McPherson.
Ralph D. Quay.
John S. Reed.
John E. Rhind.
Chas. M. Ross.
Albert E. Rudell.
Widmer J. Rutherford.
Albert E. Santo.
Wallace Seccombe.
Everett H. Simmons.
Elgin P. Smith.
Luke E. Smith.
Robt. J. Sprott.
Wm. L. Tait.
Fred C. Van Duzer.
John J. Wilson.
Clement Windsor.
Henry Winters.
Wm. J. Woods.

UNIVERSITY OF MARYLAND, DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of the University of Maryland were held in the Lyceum Theater, Baltimore, Md., on Wednesday evening, May 2, 1900.

The address to the graduates was delivered by Rev. Edmond B. Patterson, D.D., and the class oration by George W. Taylor, D.D.S.

The number of matriculates for the session was two hundred and four.

The degree of D.D.S. was conferred on the following graduates by Bernard Carter, Esq., provost of the university:

Guthrie Allison	Virginia.
Robt. E. Armstrong	Iowa.
Joseph P. Arnold	Texas.
J. D. E. Barras	New York.
Curtis S. Basehoar	Pennsylvania.
Alex. M. Bobbitt	North Carolina.
John W. Bourdier	Louisiana.
John F. Brown	Maryland.
John B. Browning	Rhode Island.
Jesse C. Bucher	Virginia.
Samuel S. Burt	New York.
Wiley L. Bush	Georgia.
Thos. E. Conrad	Louisiana.
Stewart P. Dean	Maryland.
R. W. Douglass	West Virginia.
Leonard Dressel	Maryland.
Harrison M. Dunn	Nebraska.
John S. Earman	Virginia.
E. M. Engelskircher	New Hampshire.
Edward T. Evans	Illinois.
A. W. Farnsworth	Vermont.
Robt. A. Franklin	Georgia.
Fred. H. S. Grom	New Jersey.
Frank N. Haff	New York.
Samuel Halpern	New York.
Chas. W. Hammond	Pennsylvania.
Turner A. Harris	Missouri.
Dennis R. Hartman	Pennsylvania.
Chas. W. Himmler	Maryland.
Edw. G. Holbrook	Maryland.
Robt. W. Jackson	Georgia.
Henry A. King	New York.
B. F. Leonard, M.D.	New Jersey.
Harry A. Lightner	Pennsylvania.
Albert F. Linscott	Ohio.
Thos. S. Linthicum	Maryland.
Bernard F. Mann	Maine.
Thos. F. Martin	New Jersey.
Daniel B. McCann	Canada.
Edward S. Miller	Vermont.
Oakley W. Norton	New York.
H. G. A. Oberdick	Pennsylvania.
D. C. O'Donoghue	Maryland.
Noah G. Osteen, Jr.	South Carolina.
Joe H. Paget	South Carolina.
Daniel B. Peavy	Texas.
Stephen Preston	Virginia.
Robt. L. Reaves	South Carolina.
J. R. Rogers, A.B.	South Carolina.
P. H. Stehley, M.D.	West Virginia.
Chas. F. Sumner	Canada.
George W. Taylor	Indiana.
R. R. Tillotson	New York.
J. C. Watkins, A.B.	North Carolina.
Walter N. Wayman	Virginia.
Jos. E. Willson	Indiana.

CENTRAL COLLEGE OF DENTISTRY.

The annual commencement exercises of the Central College of Dentistry were held in the Propylænum, Indianapolis, Ind., on Thursday, May 3, 1900.

The number of matriculates for the session was sixty-five.

The degree of D.D.S. was conferred on the following graduates by Dr. J. E. Cravens, president of the college:

Roscoe Akers	Indiana.
Terry Barney	Indiana.
Robert I. Bell	Indiana.
S. H. Creighton	Indiana.
A. O. Cromer	Ohio.
Charles Cunningham	Indiana.
Levi R. Gray	Illinois.
Arthur L. Hamilton	Indiana.
Wm. A. Hanna	Indiana.
James Laswell	Illinois.
W. E. McCloud	Indiana.
Frank E. McKennon	Indiana.
Watson T. Miller	Indiana.
Frank Ross	Indiana.
E. A. Sallust	Indiana.
Horace Scherer	Illinois.
Herbert C. Sears	Indiana.
Anthony F. Steinheiser	Indiana.
Claud Wiggins	Indiana.
Carl Wright	Indiana.

CINCINNATI COLLEGE OF DENTAL SURGERY.

THE seventh annual commencement exercises of the Cincinnati College of Dental Surgery were held in the Odeon, Cincinnati, Ohio, on Wednesday, May 2, 1900.

Remarks were made by Professor G. S. Junkerman, M.D., D.D.S., dean of the college, and the valedictory address was delivered by Professor H. D. Hinckley, A.M., M.D.

The degree of D.D.S. was conferred on the following graduates by Professor O. W. Martin, A.M., secretary of the board of trustees:

Harry J. Auer	Ohio.
Louie F. Beaty	Indiana.
John G. Belt	California.
Geo. T. Burton	Kentucky.
Henry O. Cain	Ohio.
James H. Chambers	Kentucky.
Jacob F. Cleek	Kentucky.
Wilford D. Doolittle	Wisconsin.
Selar A. Douglass	Ohio.
Arnold C. Driehaus	Ohio.
Robert F. Duffy	Ohio.
J. L. Goetz	Ohio.
George L. Hill	West Virginia.
Herbert T. Holdren	Ohio.
John T. Hughes	Ohio.
Leslie M. Humphrey	Ohio.
John R. Johnston	Ohio.
Frank E. Jones	Indiana.
Howard C. Junkerman	Ohio.
Maurice V. King	Ohio.
Harry J. Laque	Ohio.
Wilmer J. Lawson	Indiana.
Earl E. McMunn	West Virginia.
Robert H. Nau	Ohio.
Ross T. Neer	Ohio.
Arthur C. Peebles	Ohio.
Edwin D. Sefton	Ohio.
Augustus J. Shelk	Indiana.
Edward Ward	Indiana.
Arthur E. Wipper	Ohio.
Roscoe E. Whitted	California.
Arthur F. Woest	Ohio.

VANDERBILT UNIVERSITY, DENTAL DEPARTMENT.

THE twenty-first annual commencement exercises of the Dental Department of Vanderbilt University were held in the Theater Vendome, Nashville, Tenn., on Friday, April 27, 1900.

The number of matriculates for the session was one hundred and forty-one.

The degree of D.D.S. was conferred on the following graduates by Chancellor Kirkland, of the university:

P. C. Baird	Texas.
C. E. Byington	Missouri.
G. P. Barnes	Texas.
C. L. Buckner	Tennessee.
L. M. Bruce	Kentucky.
H. T. Boyd	Tennessee.
John Crapo	Tennessee.
S. D. Cox	Alabama.
L. S. Danley	Tennessee.
Frank R. Francis	Illinois.
C. L. Gunn	Alabama.
S. H. Guess	Mississippi.
T. L. Galloway	Tennessee.
H. P. Hopkins	Arkansas.
W. J. Isenman	Missouri.
G. L. Jackson	Texas.
H. K. Kellogg	Kentucky.
H. A. Kirksey	Alabama.
W. H. Lockhart	Michigan.
A. W. Livingston	Tennessee.
Guy Morgan	Texas.
F. W. Meacham	Tennessee.
W. P. McGaughey	Texas.
J. L. McFarland	Mississippi.
C. D. Nowlin	Tennessee.
J. M. New	Tennessee.
D. S. Prichett, Jr	Alabama.
H. B. Peacock	Alabama.
J. L. Ross	Tennessee.
Theo. Seifried	Tennessee.
C. D. Stovall	Mississippi.
Henry Selby	Mississippi.
W. E. Simmons	Kentucky.
T. A. Turner	Mississippi.
B. F. Thielen	Texas.
R. S. Terry	Texas.
B. F. Waller	Alabama.
Emma Weinberger	Illinois.
G. C. Wurzbach	Texas.
G. W. Whitsitt	Tennessee.

BALTIMORE MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE fifth annual commencement exercises of the Dental Department of Baltimore Medical College were held in the Lyceum Theater, Baltimore, Md., on Friday evening, May 4, 1900.

An oration was delivered by Christopher Johnston, M.D., M.A., Ph.D.

The degree of D.D.S. was conferred on the following graduates by S. K. Merrick, M.D., president of the college:

Henry C. Bernhardt	New York.
John W. Bracken	New York.
T. H. Charmbury	Massachusetts.
John T. Collins	Massachusetts.
T. L. Cunningham	Pennsylvania.
Louis M. Coffey	North Carolina.
Adelbert N. Drury	Massachusetts.
Fred. W. Ewbank	South Carolina.
C. W. Fitzgerald	Rhode Island.
Bert H. Goodwin	New Hampshire.
John C. Greitzner	Maryland.
Harley W. Holden	Vermont.
Chas. V. Hayden, Jr.	Maryland.
Harry E. Hewett	Massachusetts.
Wm. H. Hanrahan	Massachusetts.
John C. Joyce	Maryland.
T. M. Jacobs	North Carolina.
M. R. P. Lee	Virginia.
James W. Leiter	Maryland.
Thos. F. McPartlin	Rhode Island.
George W. McKay	Maine.
Arch. Mac Vicar	Massachusetts.
Frederick L. Miller	Rhode Island.
Francis J. O'Donnell	Massachusetts.
A. L. Pettee	Vermont.
Clarence E. Rowe	New Hampshire.
Henry F. R. Snyder	Maryland.
Henry M. Thomas	New York.

COLORADO COLLEGE OF DENTAL SURGERY.

THE annual commencement exercises of the Colorado College of Dental Surgery were held on Wednesday evening, April 25, 1900, at the Brown Palace Hotel, Denver, Col.

Addresses were delivered by Robt. Levy, M.D., and Dr. W. T. Chambers, dean. Valedictorian, Dr. L. A. Walker.

The number of matriculates for the session was forty-one.

The degree of D.D.S. was conferred on the following graduates:

T. J. Bovard	Colorado.
R. N. Culver	Missouri.
J. S. Dean	California.
H. A. Elmquist	Iowa.
A. E. Goodwin	Wisconsin.
W. E. Sanderson	Colorado.
E. A. Schlabach	Ohio.
G. Seeley	Colorado.
D. Hopkins	Colorado.
L. A. Walker	Ohio.
A. A. Wallace	Colorado.

HOWARD UNIVERSITY, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of Howard University were held in the First Congregational Church, Washington, D. C., on Tuesday evening, May 8, 1900.

The annual address was delivered by Hon. J. H. Gallinger.

The degree of D.D.S. was conferred on the following graduates by J. E. Rankin, D.D., LL.D., president of the university:

Edw. T. Goodall	Kentucky.
C. A. Gray, M.D.	District Columbia.
S. W. Jefferson	Florida.
Louis S. Meikle	Jamaica, B. W. I.
Alice M. Waring	Ohio.
Malcolm J. Winn	Massachusetts.
C. S. Wormley	District Columbia.

NORTHWESTERN UNIVERSITY DENTAL SCHOOL.

THE annual commencement exercises of Northwestern University Dental School were held at Central Music Hall, Chicago, Ill., on Wednesday afternoon, May 2, 1900.

The doctorate address was delivered by Dr. Jonathan Taft, dean of the Dental Department of Michigan University; the salutatory by Albert B. Potter, A.B., D.D.S.; the valedictory by Charles A. Peak, D.D.S., and the annual report and mandamus by Theodore Menges, B.S., D.D.S., secretary.

The number of matriculates for the session was six hundred and eight.

The degree of D.D.S. was conferred upon the following graduates by Dr. Henry Wade Rogers, president of the university:

Chas. F. Ackers	Ohio.
Theo. Ahlenfeld	Illinois.
Thos. E. Alderson	Iowa.
Alex. G. Anderson	Iowa.
George J. Andrews	Iowa.
Oakley M. Barker	Illinois.
Robert W. Beck	Illinois.
Ottmar A. Becker	Wisconsin.
Alfred M. Bell	Nebraska.
Arthur D. Black	Illinois.
Lee E. Blane	Illinois.
Deabolt M. Blass	Wisconsin.
Frank Bloom	Minnesota.
J. E. Bloomingdale	Nebraska.
Borris M. Borovik	Illinois.
Willis H. Bower	Illinois.
Wm. F. Brandt	Iowa.
Arch. F. Bronson	Iowa.
James H. Brooks	Michigan.
May L. Brooks	Tennessee.
Boyd C. Brown	Illinois.
Geo. E. Brown	Illinois.
Walter P. Butler	Illinois.
Ralph M. Cannon	Illinois.
Edw. B. Carney	Iowa.
Rolland T. Case	Wisconsin.
Miles B. Chesebro	Iowa.
Henry L. Chilson	Wisconsin.
Adelbert D. Clark	Iowa.
Winfred R. Collie	Wisconsin.
Chas. H. Converse	Illinois.
Frank D. Cooley	Indiana.
Marshall S. Cornish	Minnesota.
Daniel Costello	Minnesota.
Walter G. Courtney	Iowa.
Alva S. Craver	Illinois.
Wm. B. Crooks	Iowa.
Bert C. Cushway	Michigan.
Arthur L. Cutter	Illinois.
Andrew D. Darling	Illinois.
Wm. E. Davidson	Nebraska.
Lewis R. Dessaint	Iowa.
Alfred J. Dix	South Dakota.
Rupert C. Drew	Vermont.
Fred. A. Dryden	Illinois.
Fritz H. Dueser	Iowa.
Bernard A. Duffy	Illinois.
Moses Eisenstaedt	Illinois.
Frederick D. Fisk	Illinois.
L. H. Flanagan	Illinois.
Geo. J. Formanack	South Dakota.
Harris J. Frank	Illinois.
Geo. W. Free	Nebraska.
Albert J. Frieseke	Michigan.
Walter O. Furman	South Dakota.
Silas P. Gainforth	Nebraska.
Chas. H. Gietzen	Nebraska.
C. O. Gillette	Illinois.
F. J. Goldthorp	Illinois.
Lewis J. Goodson	Illinois.
Wm. E. Green	Illinois.
Albert P. Grunn	Minnesota.
Gail W. Hamilton	Iowa.
Chas. R. Hammond	Illinois.
Catherine H. Harlan	Iowa.
Thos. S. Harlan	Iowa.
Mary G. Hastings	Missouri.
Madeline M. Helmer	Nebraska.
Frank P. Henning	Minnesota.
Hugo Herz	Ohio.
John Hirtzel	Illinois.
Mary A. Hirsekorn	Germany.
George A. Hopf	Illinois.
R. S. Hollingsworth	Illinois.
W. G. Hollingsworth	Missouri.
Wm. T. Humphrey	Illinois.
Fred. M. Hunt	Iowa.
Percy B. D. Idler	Illinois.
Frank C. Jarvis	Michigan.
David A. Johnson	Wisconsin.
Oscar T. Johnson	Illinois.
Waldo P. Johnson	Illinois.
John C. Jones	Kansas.
William A. Kaake	Ontario.
Wm. F. Kratz	Iowa.
Robert P. Keith	Illinois.
Murray W. Kirkwood	Kansas.
Frank G. Kotler	Russia.
Ger. E. Lamberson	Oregon.
Henry C. Larson	Minnesota.
Franklin E. Lemmon	Illinois.
Richard C. Liggitt	Illinois.

John U. Leutscher	Wisconsin.
Jarosh V. Mashek	Austria-Hungary.
Sidney G. McCallin	Wisconsin.
Floyd M. McCluskey	Iowa.
Peter G. McDermott	Wisconsin.
Alex. R. Macdonald	Illinois.
Eliz. J. McDonnell	Illinois.
Gregor McGregor	Manitoba.
Robt. L. McIntosh	New York.
Earl Merritt	Indiana.
Fred. J. Mess	Washington.
Frank E. Mielke	Wisconsin.
Oscar H. Miller	Illinois.
Houston F. Methven	Illinois.
George S. Moffatt	Michigan.
Norman H. Moore	Michigan.
Alice Morton	Wisconsin.
Orla D. Morton	Indiana.
Charles Mullen	Michigan.
Royal B. Munn	Illinois.
John B. Neill	Alabama.
Julius C. Osher	South Dakota.
George A. Parks	Nebraska.
Wm. S. Park	Kentucky.
John F. Patten	Illinois.
Ira A. Payne	Minnesota.
Charles A. Peak	Utah.
Henry C. Pence	Illinois.
Albert D. Persons	Illinois.
Adolph Peterson	Massachusetts
Elmer C. Peterson	Illinois.
Edwin J. Peterson	Minnesota.
Octave W. Peterson	Nebraska.
Cory A. Philpot	Nebraska.
Chase H. Pierce	Iowa.
John F. Pitts	Illinois.
Geo. A. Pollard	Ontario.
Lemuel F. Pooler	Illinois.
Albert B. Potter	Kansas.
Edgar C. Potter	Illinois.
Edward F. Powell	Iowa.
H. L. Prettyman	Ohio.
Ross A. Pritchett	Illinois.
John G. Probst	Wisconsin.
B. F. Ransdell	Brazil.

Charles H. Read	Iowa.
Wm. L. Reedy	Illinois.
Jos. E. Rehnstrom	Iowa.
Mary G. Robeson	Illinois.
Rome H. Robinson	Illinois.
Albert B. Rood	Illinois.
Julius Ronna	Iowa.
Geo. B. Rusco	Wisconsin.
Margaret L. Safford	Illinois.
Jno. N. Sanbloom	Sweden.
Jollie N. Saxe	Wisconsin.
David C. Schiff	Illinois.
M. S. Schoenbrod	Illinois.
Agnes Seiler	Iowa.
Rudolph Serwe	Wisconsin.
Chas. P. Shewey	Illinois.
James Slaven	Wisconsin.
Claude E. Smalley	Illinois.
Otto B. Smith	Illinois.
Walter C. Smith	Illinois.
McGuire Snyder	Illinois.
Edw. W. Spessard	Iowa.
Geo. L. Stebbins	Illinois.
Arthur G. Stephens	Illinois.
Bert L. Stevens	Illinois.
Elmer D. Taylor	Nebraska.
Mahlon H. Teeter	Iowa.
Henry R. Thill	Illinois.
Edna M. Thompson	Illinois.
John C. Thompson	Illinois.
Frank B. Tims	Iowa.
Frank B. Tomlin	Illinois.
Frank D. True	Iowa.
Wm. E. Wagoner	Indiana.
Chas. H. Walsh	Manitoba.
Burnet D. Warner	Illinois.
Frank B. Weaver	Indiana.
John E. Welsh	Illinois.
Jesse A. West	Iowa.
Edw. W. Whitman	California.
J. R. Wickey	Illinois.
Chas. W. Willson	Iowa.
Wm. H. Wilson	Wisconsin.
William C. Wolfe	Missouri.
Richard Wolfrum	Wisconsin.
Willard J. Worsley	Illinois.

UNIVERSITY OF OMAHA, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Omaha were held at the Iler Grand, Omaha, Neb., on Thursday evening, May 3, 1900.

The address to the graduates was delivered by J. H. Macomber.

The degree of D.D.S. was conferred on the following graduates by A. O. Hunt, D.D.S., dean:

J. B. Bullen	Arkansas.
Mary I. Gallagher	Nebraska.
Geo. E. Hartman	Nebraska.
Julius M. Jessen	Nebraska.
Felton L. Landon	Iowa.

Claud O. Smith	North Dakota.
Harold Thomsen	Nebraska.
Geo. W. Todd	Nebraska.
William T. Uhl	Iowa.
Milburn C. Whitaker	Nebraska.

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE sixtieth annual commencement exercises of the Baltimore College of Dental Surgery were held in the Lyceum Theater, Baltimore, Md., on Monday evening, April 30, 1900.

The annual oration was delivered by Rev. C. Ernest Smith, D.D., and the valedictory by John D. Biggs, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Professor William Simon:

W. H. Arnold	Kentucky.
Robert E. Baden	Maryland.
W. R. Beattie	Pennsylvania.
John D. Biggs	North Carolina.
Wm. E. Boucher	Connecticut.
W. J. Boydston	West Virginia.
Wm. H. Buchanan	Georgia.
Harold H. Butler	England.
Simon P. Cairns	Massachusetts.
Edgar J. Cammack	Indiana.
Colin T. Campbell	England.
C. F. Carr	New Jersey.
J. M. Cook	South Carolina.
R. R. Copeland	South Carolina.
Walter R. Cochran	Ohio.
Oscar F. Ching	Pennsylvania.
Thos. B. Delcher	Florida.
James R. Dillard	Alabama.
Harry M. Doig	New York.
C. H. Dunlop	Virginia.
S. H. Easley	District Columbia.
R. E. Edwards	Pennsylvania.
Wm. E. Ferree	Indiana.
S. B. Foster	Michigan.
Mariano Fuertes	Puerto Rico.
R. E. Gibbons	Maryland.
Will. J. Golding	Canada.
Thos. M. Grace	Georgia.
S. S. Grosjean	Louisiana.
H. C. Haganour	New York.
Mrs.F.E.Hammond	New York.
Joseph W. Harbin.	North Carolina.
J. G. Heckel	Pennsylvania.
Wm. A. Hudson	Canada.
Herman C. Hupp	Ohio.
J. F. Kelley	Maine.
Jas. L. Keerans	North Carolina.
Wm. A. Kennedy	Maryland.
Francis E. King	Maryland.
G. E. Koontz	Virginia.
H. D. Lilliston	Virginia.
Chas. A. Manning	Virginia.
R. L. Mott	New Jersey.
Thos. F. Nelson	Maryland.
W. C. Palmer	Maryland.
T. R. Palmer	Florida.
Thos. R. Peeples	South Carolina.
William T. Reay	Newfoundland.
E. M. Richardson	New York.
E. E. Richardson	North Carolina.
Chas. B. Roberts	New Jersey.
Cyrus D. Sadler	North Carolina.
Edwards Sandidge	Kentucky.
Webster S. Seavey	New York.
Battle S. Searcy	Alabama.
J. A. Sinclair	North Carolina.
G. J. Smith	Maryland.
W. R. Smith	Nova Scotia.
W. W. Smith, Jr.	South Carolina.
C. W. H. Stewart	West Virginia.
N. T. Steeves	Canada.
D. P. Thompson	South Carolina.
J. D. Thompson	Canada.
E. V. Tirrell	Minnesota.
Geo. R. Tompkins	Michigan.
A. L. Uchoa	Brazil.
Theo. Ullness	Norway.
L. G. Walker	Virginia.
Leslie V. Waters	West Virginia.
H. B. Webster	Virginia.
J. S. Weatherly	Texas.
Edson M. Wilson	New Brunswick.
Jas. W. Wohrna	Maryland.
W. S. Wood	New York.

CHICAGO COLLEGE OF DENTAL SURGERY.

THE eighteenth annual commencement exercises of the Chicago College of Dental Surgery (Dental Department of Lake Forest University) were held in Central Music Hall, Chicago, Ill., on Thursday afternoon, May 3, 1900.

The faculty address was delivered by Don M. Gallie, D.D.S.; the doctorate address by Charles A. Blanchard, A.M., D.D., president of Wheaton College, and the valedictory by Louis E. Arnold, D.D.S. Addresses were also made by J. G. K. McClure, D.D., president of the university, and by Wm. M. Lawrence, D.D

The degree of D.D.S. was conferred on the following graduates by Truman W. Brophy, M.D., D.D.S., LL.D., president of the college:

Lewis E. Alkire.
Andrew J. Ardner.
Louis E. Arnold.
Wilbur O. Aten.
Chas. G. Bacon.
Magnus L. Bast.
John Bast, Jr.
Orrin L. Beeson.
Chas. L. Belscamper.
Benj. Blatchford.
John A. Bullard.
Edwin C. Bock.
Earl D. Boyd.
Ernest E. Braley.
Joseph E. Brager.
Nickell F. Brown.
Jos. T. Buckingham.
Joel W. Bingham, Jr.
James H. Benedict.
John E. Bowyer.
Kenneth C. Campbell.
Clyde C. Carrick.
John B. Chappell.
Gustavus A. Clark.
Lewis C. Coe.
Francis B. Collins.
Edwin H. Crawford.
Clyde C. Crouch.
Joseph P. Crowe.
Edwin J. Campbell.
Charles W. Davis.
Calvin A. Dennis.
Thos. P. Donelan.
Emil C. Dieckhoff.
John V. Ducey.
William O. Dicus.
Edmund G. Dundass.
Bryant H. Everest.
Guy C. Fraker.
Roy A. Funk.
Wm. G. Fortune.
Hugh Galbraith.
Thomas E. Gaston.
Garrett J. Gerretson.
James C. Gibson.
William J. Gillies.
Samuel W. Gilson.
Franklin J. Gostelow.
Wm. R. Gostelow.
Norman C. Grove.
George N. Grove.
Nicholas A. Guthrie.
Henry A. Grammer.
William A. Goslee.
Frank A. Gore.
Eugene D. Hatch.
Harold J. Hansen.
John J. Hammond.
Edw. T. Hamilton, Ph.G.
Emmet C. Hallock.
Frank H. Hillemeyer.
Henry Hoesly, Ph.G.
Herman H. Hoffman.
Wm. H. Hersh.
Frank A. Hoyt.
Fred H. Helt.
John W. Hodson.
Henry L. Jamieson.
John A. Janett.
Henry G. Johnson.
Adolph R. Juengling.
Alfred I. Kutch.
Horton F. Kimball.
Samuel W. Kuster.
Ernest E. Kerr.
John B. Kibler.
William H. Land.
Edw. P. Lawrance.
Daniel P. Mahony.
Joseph F. Martin.
Robert E. MacBoyle.
Harry A. McCallister.
Richard D. McEvoy.
John N. McLeish.
Wm. F. Meagher.
Thos. J. Metcalf.
Thomas M. Mills.
Walter B. Murphy.
Chas. B. McCandless.
Marion L. Myers.
Oscar H. Mayer.
Harry E. Nickson.
Helge Norman.
Charles C. Norris.
Ira P. Norton.
Harry L. Olcott.
Lewis G. Olmsted.
Jewett C. Parker.
Frank D. Parker.
Arnold A. Peterson.
Harry B. Pinney.
Olin S. Proctor.
George W. Reese.
Frank M. Richardson.
Hugo C. Rietz.
Perry L. Rigg, Ph. G.
Henry T. Rink.
Sidney W. Ritchie.
Yanno J. Roth.
Harry W. Ruge.
John Schleiter, Jr.
Chas. D. Schloesser.
Otto C. Schmedeman.
Aloysius F. Schultz.
Samuel J. Scott.
Albert C. Senneff.
Lawrence R. Sevier.
William J. Sheehy.
Alexander Schutt.
Chas. H. Shurtleff.
Detlef Sievers.
George W. Slingluff.
Charles G. Smith.
Charles M. Snyder.
Herman Sturtz.
Bruce Saulter.
Edw. A. Smith, B.A.
George Schneider.
Joseph J. Tipler.
Dwight L. Thompson.
Samuel D. Towle.
Daniel D. Van DeGrift.
George W. Van Verst.
A. L. J. C. Van Hasselt.
Mark E. Vance.
Eugene A. Wayland.
Walter J. Weatherwax.
Adelbert A. Welch.
John R. Whiffen.
Geo. R. E. Williams.
Alvin I. Williams, Ph.G.
Oliver L. Williamson.
Jerome E. Willman.
Chas. H. N. Wolavka.
Theo. C. Wyneken.
Harry E. Walsh.
Robert J. B. Yule.

MEHARRY MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE fourteenth annual commencement exercises of the Dental Department of the Meharry Medical College were held in Nashville, Tenn., February 21, 1900.

The degree of D.D.S. was conferred on the following graduates: A. York, Springfield, Ill.; W. E. Braswell, Macon, Ga.

INDIANA DENTAL COLLEGE.

The annual commencement exercises of Indiana Dental College were held in English's Opera House, Indianapolis, Ind., on Saturday, April 28, 1900.

The number of matriculates for the session was two hundred and seventeen.

The degree of D.D.S. was conferred on the following graduates by B. A. Jenkins, president of the University of Indianapolis:

T. B. Alsop	Indiana.
P. L. Beal	Ohio.
W. A. Birch	Indiana.
Will. Blickenstaff	Indiana.
G. J. Bookwalter	Kansas.
I. W. Borden	Indiana.
H. E. Boudinot	Illinois.
J. C. Branham	Indiana.
Lon Chapman	Indiana.
W. A. Chapman	Indiana.
J. H. Coe	North Dakota.
C. M. Corns	Ohio.
L. T. Davies	Iowa.
F. W. Davis	Indiana.
Ellison Dixon	Indiana.
E. R. Donnell	Indiana.
P. G. Eddy	Ohio.
W. T. Edwards	Indiana.
E. W. Ellis	Indiana.
W. F. Faries	Indiana.
Berton Featherstone	Minnesota.
A. R. Friedman	Indiana.
J. O. Fryer	Indiana.
H. E. Gage	Wisconsin.
F. E. Grafft	Indiana.
C. B. Green	Minnesota.
C. W. Griffith	Indiana.
L. J. Haas	Indiana.
J. H. Hite	Illinois.
Mrs. Jennie Hockett	Indiana.
J. A. Holden	Missouri.
R. M. Hollingsworth	Indiana.
H. M. Hunt	Indiana.
A. A. Johnson	Indiana.
Walter Kennard	Indiana.
F. L. Lafferty	Indiana.
R. G. Litsey	Kentucky.
J. H. Loertz	Indiana.
H. R. Lotshar	California.
C. H. Metsker	Indiana.
J. F. Meyer	Kentucky.
C. P. Miller	Indiana.
J. M. Miller	Indiana.
G. A. Mills	Illinois.
Chris. Olsen	Indiana.
H. P. D. Schaffer	Ohio.
Wm. Schlosser	Indiana.
P. F. Schmidt	Indiana.
Martin Schumacher	Indiana.
W. F. Shepherd	Indiana.
S. B. Shonkwilder	Indiana.
K. H. Shreve	Pennsylvania.
W. J. Smith	Indiana.
O. E. Starr	Indiana.
W. H. Stephens	Illinois.
C. E. Stephenson	Indiana.
Lloyd Stevenson	Indiana.
F. H. Swart	Michigan.
H. J. Templeton	Indiana.
W. L. Todd	Indiana.
M. M. Walker	Indiana.
F. W. Williams	Indiana.
N. N. Williams	Indiana.
H. S. Winzeler	Ohio.
F. E. Yule	Indiana.

UNIVERSITY COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of the University College of Medicine were held in the new Academy of Music, Richmond, Va., on Thursday evening, April 26, 1900.

An address was delivered by Hon. A. J. Montague.

The number of matriculates for the session was thirty.

The degree of D.D.S. was conferred on the following graduates by Professor L. M. Cowardin, chairman of the Dental Department:

Hilary F. Bowles	Virginia.
Wm. E. Broaddus	Virginia.
Dabney L. Chapman	Texas.
Victor W. Crossman	New York.
Wm. A. Hammen	Virginia.
Fred. A. Wood	Virginia.

WESTERN DENTAL COLLEGE.

The tenth annual commencement exercises of the Western Dental College were held in the Academy of Music, Kansas City, Mo., on Monday evening, April 30, 1900.

The annual address was delivered by Herbert S. Hadley.

The degree of D.D.S. was conferred on the following graduates by D. J. McMillen, M.D., D.D.S., dean of the college:

Mrs. L. K. Bennett	Kansas.	Warren Marshall	Kansas.
Herbert Bertenshaw	Kansas.	Isaac W. McClanahan	Missouri.
B. F. Blanton	Missouri.	Myron J. McKee	Kansas.
Frank G. Boyer	Missouri.	Sam. S. McMillen	Missouri.
Edgar A. Bricker	Missouri.	Earl Mills	Missouri.
H. L. Cannon	Missouri.	Lena Monfort	Missouri.
Frank Cave	Missouri.	Nolan Moore	Arkansas.
Hale De Jarnett	Missouri.	Wm. P. Moore	Missouri.
Jacob G. Dimoush	Missouri.	W. Ernest Neel	Missouri.
Harley Entriken	Missouri.	A. A. Nicol	Missouri.
John P. Fields	Missouri.	W. T. Raffington	Kansas.
W. B. Floyd	Kansas.	C. F. Rhodes	Wisconsin.
E. C. Frank	Missouri.	Will Richcreek	Missouri.
Clay S. Fuller	Missouri.	Fred. W. Robertson	Kansas.
James W. Funk	———	W. W. Russ	Kansas.
E. A. Gaston	Kansas.	Gus F. Scholle	Missouri.
G. E. Genung	Iowa.	Jas. T. Sherry	Missouri.
Perry F. Gilbreath	Missouri.	Stanley S. Simpson	Kansas.
James C. Gillis	Kansas.	Chas. A. Smith	Ohio.
Stone Gossett	Missouri.	W. H. Snyder	Kansas.
Levi H. Halbert	Kansas.	J. R. Stowers	Missouri.
Stanley E. Harley	Missouri.	W. E. Taylor	Missouri.
Eugene E. Hobbs	Nebraska.	E. D. Vansyckle	Illinois.
H. M. Hutton	Missouri.	Marion M. Vaughn	Missouri.
Bernie E. Kelly	Kansas.	Allen Voires	Kentucky.
Ed. C. Lamont	Missouri.	C. B. Werts	Indiana.
Chauncey R. Leverich	Missouri.	G. R. White	Missouri.

DENTAL SOCIETY ANNOUNCEMENTS.

NATIONAL DENTAL ASSOCIATION.

Following is a preliminary program of papers to be read before the different Sections at the annual meeting, July 10, 1900:

Section II.—Dental Education, etc.

"Our Dental Educational System." Dr. M. F. Ault.

Section III.—Papers and Essays.

"Grinding the Natural Teeth for the Purpose of Contouring the Interproximate Space and Improving Point of Contact." Dr. Laurence P. Leonard.

"Treatment of Root-Canals." Two papers, by Drs. Jules J. Sarrazin and A. E. Webster.

"Porcelain Inlays." Two papers, by Drs. J. E. Wilkinson and Joseph Head.

Papers by Dr. C. N. Johnson, Dr. E. C. Kirk, and Dr. E. K. Wedelstaedt; subjects not announced.

"Some Suggestions in the Treatment of Teeth." Dr. A. C. Brewer.

SECTION III.—Clinics.

Treatment of Pyorrhea Alveolaris. Dr. Howard T. Stewart.

Use of Manu-dynometer and Gnatho-dynometer. Dr. G. V. Black.

Porcelain Crown- and Bridge-Work; with Models. Dr. H. J. Goslee.

Implantation as a Radical Cure for Pyorrhea Alveolaris. Illustrated with Skiagraphs. Dr. James E. Keefe.

Cavity Preparation. Dr. C. N. Johnson.

Gold Inlays. Dr. W. V-B. Ames.

Method of Combining Cement and Amalgam for Filling Teeth. Dr. L. C. Taylor.

Dentenax Teeth for Crown- and Bridge-Work. Dr. R. C. Brophy.

Jenkins Porcelain for the Production of Buccal Faces for All-gold Crowns. Dr. George Evans.

SECTION V.—Anatomy, Pathology, and Surgery.

The chairman of the Section selects the subjects upon which papers are to be presented, and names the essayists. He has for this year prepared the following program:

Anatomy.

"Source of Nutrition of the Dental Pulp." Dr. A. O. Hunt.

"The Evolution of the Bunodont from the Haplodont Forms of Teeth." Dr. A. H. Thompson.

Pathology.

"The Pathological Changes in Pyorrhea Alveolaris." Dr. M. L. Rhein.

"Oral Manifestations of Syphilitic Infection," illustrated by stereopticon. Dr. W. C. Barrett.

Surgery.

"Surgical Treatment of Fractures of the Maxillæ." Dr. J. S. Marshall.

"Antiseptic Surgery of the Face and Mouth." Dr. W. H. G. Logan.

INTERNATIONAL DENTAL CONGRESS.

THE following papers will be read by the undermentioned gentlemen at the International Dental Congress to be held in Paris, France, August 8 to 14, 1900:

A. K. Fort, D.D.S., Atlanta, Ga. "The Influence of the Saliva on Bacterial Growth in the Mouth."

W. A. Price, D.D.S., Cleveland, Ohio. "The Science of Dental Radiography." (Illustrated.)

Richard Grady, M.D., D.D.S., Baltimore, Md. "Instructing our Patients in the Care of the Mouth and Teeth."

R. R. Andrews, A.M., D.D.S., Cambridge, Mass. "The Development of the Enamel."

Geo. W. Cook, D.D.S., Chicago, Ill. "A Bacteriological Study of Pyorrhea Alveolaris."

C. S. Case, M.D., D.D.S., Chicago, Ill. "Important Principles in Dento-Facial Orthopedia."

R. H. Hofheinz, D.D.S., Rochester, N. Y. "Our Preliminary Educational Deficiencies."

E. H. Angle, M.D., D.D.S., St. Louis, Mo. "The American Type of Dento-Facial Deformity."

J. E. Hinkins, D.D.S., Chicago, Ill. "The Chemical Action of Cements in the Mouth."

I. N. Broomell, D.D.S., Philadelphia, Pa. "The Source of Nutrition of the Dental Pulp."

T. W. Brophy, M.D., D.D.S., LL.D., Chicago, Ill. "Surgical Treatment of Palatal Defects."

W. C. Barrett, M.D., D.D.S., Buffalo, N. Y. "International Dental Ethics."

B. Holly Smith, M.D., D.D.S., Baltimore, Md., will open the discussion on "Education."

Jonathan Taft, A.M., M.D., D.D.S., Cincinnati, Ohio. "Dental History."

A. W. Harlan, A.M., M.D., D.D.S., Chicago, Ill. "Pulp Digestion."

E. R. Warner, M.D., D.D.S., Denver, Col. "Some Phases of Mummification."

It is expected that a few additions may be made to this list.

The following gentlemen will give clinics:

W. V-B. Ames, D.D.S., Chicago, Ill. "Some Possibilities of New Process Oxyphosphate of Copper."

Gordon White, D.D.S., Nashville, Tenn. "A Compound Filling, using in the Cavity Tin, Abbey's Non-Cohesive Gold, and Nickold's Cohesive Gold."

Joseph Head, M.D., D.D.S., Philadelphia, Pa. "Porcelain Inlays."

Alfred Owro, M.D., D.M.D., Minneapolis, Minn., will prepare a step cavity in an incisor or bicuspid, and fill same with DeTrey's Crystal Mat Gold (Solila).

Joseph W. Wassall, M.D., D.D.S., Chicago, Ill. "The Treatment of Septic Pulpless Teeth."

Hart J. Goslee, D.D.S., Chicago, Ill. "Porcelain Crowns and Bridge-Work."

Robert Good, D.D.S., Chicago, Ill. "Porcelain Bridge-Work."

V. H. Jackson, M.D., D.D.S., New York. "Jackson's System of Constructing Appliances for the Correction of Irregularities of the Teeth."

Levitt E. Custer, D.D.S., Dayton, Ohio. "The Electric Oven and Electric Gold Annealer."

W. E. Griswold, D.D.S., Denver, Col. "A Removable Crown for the Support of Saddle Plates or Bridges."

E. K. Wedelstaedt, D.D.S., St. Paul, Minn. "Gold Filling." Mesio-occlusal Cavity in Upper First Molar, demonstrating Dr. G. V. Black's method of (1) Cavity Preparation. (2) Extension for Prevention. (3) Occlusal Anchorage. (4) The use of Annealed and Unannealed Gold. (5) Method of finishing (using the Black saw and finishing files). (6) Proper Contact, also (7) The Scientific Application of the Rubber Dam, and (8) The Wedelstaedt System of Measurement, and its application to cavities in the human teeth.

Frank Holland, M.D., D.D.S., Atlanta, Ga. "Cohesive Gold Filling."

T. W. Brophy, M.D., D.D.S., LL.D., Chicago, Ill. "Surgical Treatment of Congenital Cleft Palate."

There are three or four additional clinicians to be heard from.

A. W. Harlan, *Chairman.*
W. E. Griswold, *Secretary.*

RECEPTION COMMITTEE.

THE following named gentlemen constitute a reception committee appointed by the management of the International Dental Congress at Paris, for looking after the welfare of residents of the United States attending the dental congress: Dr. du Bouchet, president, 8 Boulevard des Capucines; Dr. Roussell, secretary, 74 Boulevard Haussman; Drs. Barrett, Bogue, Crane, Daboll, I. B. Davenport, W. Davenport, Fay, Gires, Hotz, Lie, Levett, Meng, Georges Ryan, Jean Ryan, J. H. Spaulding, and Silva.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE next annual meeting of the National Association of Dental Faculties will convene at Old Point Comfort, Va., immediately after adjournment of the National Dental Association, on July 13, 1900. The Executive Committee will be called together on the morning of July 11, at 10 o'clock. All colleges making application for membership, or having other matters of business to bring before this body, will meet them at the same time and place.

All colleges, members of this association, and colleges making application for membership in this body, are hereby notified that the following resolutions, adopted at Niagara, will be enforced at the coming meeting:

"*Resolved,* That all colleges, members of this association, shall, each year before the annual meeting of this body, send a copy of their announcement for the coming year to each member of the Executive Committee, and that one of these be brought to the meeting for its use; and would further request that the credentials of the representatives be printed and bound in the annual announcement;

"*Resolved, further,* That colleges making application for membership in this body shall also have present a copy of their annual announcement, and that a duly authenticated representative of this school be present at the meeting, without which the application shall not be considered."

S. W. FOSTER, *Sec'y. Exec. Com.*

NEW JERSEY STATE DENTAL SOCIETY.

THE thirteenth annual meeting of the New Jersey State Dental Society will be held at the Auditorium, Asbury Park, N. J., commencing 10 A.M., Wednesday, July 18, 1900, and continuing the 19th and 20th.

Five excellent papers by well-known dentists have been secured, and as usual the clinical features in oral work, prosthetic dentistry, electrical furnace, porcelain work, gold crowns, bridges, and allied subjects will be interesting and instructive to all members and visitors.

The exhibits in the large hall of the Auditorium will be the largest and most comprehensive ever before attempted by the society. The clinics will be under the personal supervision of Dr. Frank L. Hindle, of New Brunswick, and aids, and the exhibits under Dr. F. Edsall Riley, of Newark, and aids.

The headquarters will be at the Hotel Columbia, with rates of $2.50 and $3.00 per day. The profession generally are invited to participate.

CHARLES A. MEEKER, D.D.S., *Secretary.*
HERBERT S. SUTPHEN, D.D.S., *Assistant Secretary.*

AMERICAN DENTAL CLUB OF PARIS.

The American Dental Club of Paris desires to make known to all American dentists visiting Paris for the International Dental Congress that the members of the club place at their disposal some rooms which are in a central location, 40 rue des Mathurins, where mail can be sent, and where light refreshments can be obtained.

The club extend a cordial invitation to all their American *confrères* to make use of these rooms as a general headquarters from August 5 to August 15.

C. V. DuBouchet, *President,*
8, Boulevard des Capucines.

Geo. A. Roussel, *Secretary,*
74, Boulevard Haussmann, Paris.

WISCONSIN STATE DENTAL SOCIETY.

The thirtieth annual meeting of the Wisconsin State Dental Society will be held at La Crosse, Wis., July 17, 18, and 19, 1900. A cordial invitation is extended to all members of the profession to be present.

W. H. Mueller, *Secretary,*
21 West Main street, Madison, Wis.

COLORADO STATE DENTAL ASSOCIATION.

The fourteenth annual meeting of the Colorado State Dental Association will be held in Boulder, Tuesday, Wednesday, and Thursday, June 12, 13, and 14, 1900. Members of the profession are cordially invited.

Florence S. Green, *Cor. Secretary.*

EDITORIAL.

"DIPLOMACY AND DENTISTRY."

"Under this heading there appeared an article in the April number of the Dental Cosmos, to the effect that 'certain individuals with more energy than judgment have, through political influence, secured an audience with the Secretary of State, and obtained his promise to instruct our ambassador at the Court of St. James to endeavor to have removed the restrictions imposed by the dentists act of England, which operate against the admission of holders of the American degree to practice in Great Britain.'

"The article was read at a meeting of the 'Central Verein in Amerika Graduirter Doctoren der Zahnheilkunde,' which took place at Berlin, Germany, at Easter, and made a profound and painful impression upon all members who had come from different parts of Germany to participate at said meeting.

"The 'certain individuals' who succeeded in obtaining an audience with the Secretary of State did quite the right thing and pursued the proper course in order to achieve success for their undertaking. It would be glad tidings for the D.D.S. in Germany if similar steps were taken in their behalf in America.

"The writer of said article in the Dental Cosmos does not seem to be familiar with the difficulties that D.D.S. of reputable American colleges have to undergo on this side of the Atlantic.

"No dentist in America who is acquainted with European dental affairs will for a moment sanction the argument which the writer of the article has brought forth in such strong language. Whether or not the dental profession of England will resent any endeavor on our part to gain admission for American dentists to practice in England need not restrain us to make every effort to gain that point. Sentimentality counts for naught in affairs where vital interests are at stake.

"The only way, and the right way to uphold American dentistry in Europe is by having the Secretary of State instruct the ambassadors in Europe to look after the interests of American degrees, and it is to be hoped that they will do so with all the energy which is in harmony with diplomatic courtesy.

"The writer of said article says 'we would certainly resent any diplomatic interference with our educational standard by the representative of another nation.' The institutions of the United States are so very liberal to foreigners (far too liberal) that it would be folly for representatives of other nations to interfere with them. If the educational standards of other nations were as liberal to Americans, then it would become superfluous to take such steps as were taken by 'certain individuals' with the Secretary of State.

"HUBERTUS E. VOSS, D.D.S.,
"Vorstand der Section Bayern, Central Verein in Amerika Graduirter Doctoren der Zahnheilkunde.
"MUNCHEN, May, 1900."

WE gladly print the foregoing criticism, as it is a fair example of the attitude of those who from an imperfect understanding of the principles upon which dental legislation is based arrive at illogical conclusions from meager premises. Let us grant that the D.D.S. degree does not receive the same recognition in Germany, France, England, and elsewhere that the holders of native qualifications of dentistry are accorded in the countries named, and let us admit further that because of this lack of recognition the holders of the D.D.S. are beset with difficulties. We still contend that the differences involved are not proper matters for diplomatic interference by the high officials of state of the respective countries involved.

Our critic very correctly says that "sentimentality counts for naught in affairs where vital interests are at stake," but he is fundamentally wrong when he asserts that "the only way and the right way to uphold American dentistry in Europe is by having the Secretary of State instruct the ambassadors in Europe to look after the interests of American degrees." Our first business must be to see to it that the American degree D.D.S. is made to represent a uniform basis of instruction and training preliminary to its attainment. If our critic entertains the belief that every D.D.S. degree represents equivalent culture, he needs to inform himself more fully. The very fact that the D.D.S. degree may mean little or much has in the land of its birth compelled interference by the several states to prevent the granting of it *ad libitum* by denying its holders the license to practice until designated officials of the state have determined its educational worth in each instance.

Certain states demand a higher educational equipment for the dentist than do others; a demand which is made in the interest of public safety and protection of the citizen against professional incompetency, a right conferred upon the states by the general constitution. The same right is exercised in all civilized countries as a function of their police power. To attempt to coerce one state having a higher standard to accept and license the practitioners of another state having a lower standard would be an interference with its inherent constitutional right, and even, putting it mildly, "an impertinence which would be justly resented." There is but one possible method under existing conditions by which interstate recognition can be obtained, and that is upon the basis of a uniform educational standard; not by political diplomacy nor professional sentimentality. It is useless and apart from the question to draw comparisons as to the relative manipulative skill of the several classes of practitioners so frequently indulged in with reference to the question at issue. If Germany, France, or England chooses to establish a standard which they require their practitioners of dentistry to attain before they are permitted to practice, they have a perfect right to do so, and any dentist who invades such territory with the intention of practicing upon its inhabitants should be compelled to conform to the standard prescribed for and demanded of the native.

The whole difficulty grows out of the attempt to convince the native dentist that the D.D.S. degree represents in all cases the same standard of qualification as that of his own country. Well, it doesn't. Some D.D.S. degrees are probably as good as some other dental degrees or qualifications, but all D.D.S. degrees are not as good as all other dental degrees; and until greater uniformity, or we should say some attempt at uniformity, has been made with tangible results in dental qualification, the existing discrepancies and discord will continue.

The work has been undertaken, and will be carried on until a basis of uniformity has been attained. Then it will be time to ask the Secretary of State to instruct the several ambassadors to take cognizance of the fact, and they can then do so with less certainty of receiving a diplomatic rebuff for their interference.

In the mean time our critic will probably have to contend with the difficulties complained of, unless he intensifies them somewhat further by agitating the fruitless plan of attempting to cure them by state diplomatic interference.

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If the size of the volume may be taken as an indication of the work accomplished, then the National Association is to be congratulated upon the result of its labors, for as a whole it is the largest annual output of work yet achieved. Taken altogether, the papers, many of which have appeared in the pages of the DENTAL COSMOS, are highly creditable, and in numerous instances are representative of much original work and careful thought. There is shown a decided tendency to scientific observation and research, which is the most encouraging feature of the volume, and which presages better and more thorough work for the future.

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OBITUARY.

DR. J. C. GOODRICH.

DIED, November 29, 1899, at his home, Wentzville, Mo., JOS. C. GOODRICH, M.D.S., in his seventy-fifth year.

Dr. Goodrich was born in Amherst county, Virginia, April 14, 1825, but from early boyhood had lived in Missouri, in St. Charles and Montgomery counties. His acquaintance with the dental art as then understood began at Danville, Mo., under Dr. Socrates Hubbard, a physician who had migrated from one of the Eastern states. His own independent practice began in Danville in 1852. At the time of his death there were but two others in the state who could claim to have seen longer service,—viz, Dr. James A. Price, of Savannah, Mo., and Dr. H. J. McKellops, of St. Louis.

Dr. Goodrich was an ardent worker in the interest of his profession. He was one of the charter members of the Missouri State Dental Association, of which he was elected president in 1870. It is probable that in all the years that have since elapsed he had not missed more than half a dozen of its meetings since its organization. In 1890 the Missouri Dental College conferred upon him an honorary diploma, which honor he highly appreciated.

Dr. Goodrich was married, first, in 1858, at Truxton, Mo., to Miss Anne Franz, who died in 1875; secondly, in 1879, to Mrs. Maria Wommack, who died in 1897. Of his eight children,—all being issue of his first marriage,—three died in infancy, and five still survive. The youngest, W. Geo. Goodrich, D.D.S., of Chillicothe, Mo., was for many years his father's companion in his practice.

DR. DAVID E. HAYNIE.

DIED, November 29, 1899, at Covington, Tenn., from pneumonia, Dr. DAVID E. HAYNIE, in his fifty-fifth year.

Dr. Haynie was born at Gallatin, Tenn., in 1845. He was reared on a farm, and a considerable part of his life was passed in a rural district. It was not until some time in the eighties that he undertook the study of dentistry. After a stay in Chicago for the purpose of fitting himself for the dental profession he returned to Tennessee, and established himself, about the beginning of 1891, at Covington, where he practiced until his death, and where he won a very high place in the esteem of the community. Dr. Haynie was a man who combined a kind, gentlemanly address with a thoroughly reliable and noble Christian character. He was a leading member of the Methodist Church, was eminent in works of charity, and no man in the community exerted a stronger influence for good than he.

Dr. Haynie had been three times married. His third wife, formerly Miss Amanda E. Chism, to whom he was married in December, 1893, survives him. He also leaves a married daughter.

DR. CLARK SMITH.

DIED, December 14, 1899, at Fair Haven, Vt., CLARK SMITH, M.D., in his sixty-eighth year.

Dr. Smith, who has been a familiar figure in Fair Haven for nearly half a century, met his death by being crushed between the platform and a passenger coach, having unfortunately missed his footing while alighting from a moving train. He was born at Hartford, N. Y., November 6, 1832. After a course of study he was graduated from Geneva Medical College in 1852, and in 1854 from the University of Buffalo. He also studied dentistry in the office of Dr. Hayes, of Buffalo. He settled at Fair Haven in 1857, having previously practiced in Hartford, N. Y., his native town, for a short time. During the war he served the Union cause as acting assistant surgeon, Battery C, First Pennsylvania Artillery, and later as assistant surgeon, One Hundred and Sixty-ninth New York Volunteers.

Dr. Smith leaves a widow, formerly Miss Hermione Smith Morrison, to whom he was married, at Hartford, N. Y., May 3, 1858.

DR. FERDINAND DAVISON.

DIED, February 2, 1900, at Laurel, Hanover county, Va., Dr. FERDINAND DAVISON, in his seventy-seventh year.

This veteran dentist of Virginia was not a native of the South, but was born in Monroe county, N. Y., July 21, 1823, and his boyhood was passed in the same locality. Having chosen medicine as his specialty, he entered Geneva, N. Y., College, and after obtaining his degree he for two years practiced medicine, which, however, was then relinquished in order that he might apply himself to dentistry. When he had fitted himself for his new profession,—viz, in 1846,—he married and went South, settling in Bedford county, Va. In 1856 he removed to Richmond, where he practiced during the remainder of his long professional life, and where his ability and his high personal character gave him eminence among its best and most beloved citizens. Some years ago he purchased a farm at Laurel, Henrico county, where he had since resided.

Dr. Davison, as stated, was married in 1846. A domestic life of exceptional happiness was vouchsafed to the couple, who were privileged to celebrate their golden wedding. The death of his wife in March of last year was a blow from which Dr. Davison never entirely recovered. Of his ten children three survive,—Drs. Geo. F. and W. F. Davison, of Richmond, and Miss Mary E. Davison.

DR. FREDERICK A. PRINCE.

Died, February 6, 1900, at Winchester, Mass., Dr. Frederick A. Prince, from heart-failure, in his sixty-first year.

Dr. Prince, who was born August 29, 1839, in Portland, Me., first made acquaintance with the dental art by a pupilage spent with Dr. Osgood, then of Portland, and later of Boston. The smooth current of his life being interrupted by the breaking out of the civil war, he enlisted and fought for the Union cause in the Twenty-fifth Maine, in Gen. Francis Fessenden's command. At the conclusion of the great struggle he established a dental office at Portland, but afterward went to South America, where he practiced his profession for a long series of years, having been associated with Drs. Webster and Kimball at Buenos Aires, etc., and having practiced at Montevideo for twenty-four years, returning only recently to the United States. He had for many years been a sufferer from pulmonary weakness. He had traveled extensively in Central and in South America, and spoke the Spanish language as well as kindred tongues with fluency; he was a man of keen observation and considerable learning.

Dr. Prince leaves a widow and two sons,—Philip and Frederick. Mrs. Prince was formerly Miss Mary B. Hamilton, daughter of Captain Hamilton, of Portland, Me.

DR. F. A. DESCHAUER.

Died, January 4, 1900, at his home in Chicago, from pneumonia, Dr. Frederick A. Deschauer, in his forty-third year.

Born July 18, 1857, in Chicago, of which city his uncle, Dr. Joseph Deschauer, was one of the pioneer and leading dentists, it was natural that the subject of this notice should have grown up with a leaning toward the profession of dentistry, and, accordingly, he became associated with his uncle's practice, and eventually succeeded to it. At the time of his death he had been practicing in his native city for twenty-eight years, and to all appearance his many friends were justified in looking forward to a continuance for many more years of a happy domestic life and a successful professional career; but he was attacked with pneumonia during the closing days of the year, to which disease he finally succumbed. He was a member of the Loyal Legion and of other orders, which were represented at his obsequies, the interment being at Graceland.

Dr. Deschauer was married to Miss Catharine Becker, September 18, 1884, in Chicago. She, with five children, survives him.

DR. W. E. HAWK.

DIED, December 17, 1899, at Bellevue, Pa., Dr. W. E. HAWK, from apoplexy, in his fifty-second year.

Born at New Paris, Ohio, March 25, 1848, Dr. Hawk in 1870 entered the office of Dr. Dills, at Piqua, Ohio, as a pupil in dentistry, and later continued his studies in Dayton, Ohio. In 1873 he removed to Indiana, to join Dr. Cummins, of Elkhart. In 1879 he again removed, this time to Detroit, Mich., to share the practice of Dr. W. H. Kessler. Dr. Hawk was considered one of the most expert prosthetic dentists in the country.

He was married, February 25, 1886, at Detroit, Mich., to Myra A. Johnson, who, with three sons, survives him.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING APRIL, 1900.

April 3.—No. 646,603, to Herman R. Nehrbass. Artificial tooth.
" " —No. 646,629, to William P. Sugatt. Tooth-regulator.
" " —No. 646,764, to Thomas Steele. Artificial tooth.
" *10.*—No. 647,010, to Frank L. Marshall. Dental plugger.
" " —No. 647,400, to Arthur L. Glew. Artificial denture.
" *17.*—No. 647,557, to Henry L. Cruttenden. Dental combination tool.
" " —No. 647,574, to Samuel M. Myers. Dental dam-holder.
" " —No. 647,736, to John D. Wilkens. Dental hand-piece.
" " —No. 647,865, to Alfred Pagé. Artificial tooth.
" *24.*—No. 647,956, to Nelson R. Ford. Dental tool.
" " —No. 648,106, to Harry W. Heinz. Dental engine.
" " —No. 648,196, to Wm. P. Dickinson. Dental matrix-holder.
" " —No. 648,242, to Jas. A. Cronkhite. Instrument sterilizer.

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ORIGINAL COMMUNICATIONS.

THE RELATION OF MANUAL TRAINING HIGH SCHOOLS TO DENTAL SCHOOLS.

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(An address before the Valley District Dental Society of Massachusetts, April 19, 1900.)

THE immediate occasion of my being asked to speak to you tonight, I suppose, is the correspondence which has appeared in a recent number of *Items of Interest* commenting upon the questions raised by Dr. Edward C. Kirk, of Philadelphia, in a paper on the nature of the preliminary education which should be required of candidates for admission to dental schools, and how such preliminary training may best be secured. Dr. Kirk asks whether manual training and the higher intellectual training may not be so combined as to furnish the ideal preparation. The specific question to which I am expected to address myself is, therefore, "Does the manual training high school offer especially valuable preparation for professional schools of dentistry?"

In order to discuss such a question fairly, one should have in mind first a clear idea of the preparation which the dental schools demand, or should demand. I do not refer to the schedule of requirements for admission, or to the character of the entrance examinations, which are probably not uniform, and, if they were, could not furnish a definite description of the ideal preparation for the study of dentistry. I use the word "preparation" to cover all the necessary literary and scientific studies which may be scheduled, and also those qualifications which are not found printed among the admission requirements of any schools, such as the power of discriminating observation, judgment, reasoning; ability to direct muscular movements, especially of the arms and hands, with dexterity, precision, and strength; and those general attributes of character useful in any calling, honesty of purpose, patience, industry, and perseverance.

This may be an incomplete and not very specific description of the ideal qualifications for entering upon professional training for dentistry. Others are better qualified than I am to go into details of such a matter, but I think that you must admit that I have mentioned some fundamentally important qualifications; and it is the general and fundamental requirements of the case, rather than specific details, that we have to deal with.

Although I have tried to state these requirements as I think they should appear from the point of view of the special school of dentistry, I am aware that I have suggested an ideal broad enough for other preparatory schools,—one that will serve as a basis for any professional training of a technical character. But is this not as it should be? A public high school, whether it be a manual training school or a purely academic school, must have as its aim the all-round education and training of the students committed to its charge. It must be admitted, of course, that in stating this as the aim of the public high schools I am speaking of an ideal which is imperfectly realized, at least in very many cases. There is, of course, a great lack of uniformity in the curricula and the methods of the secondary schools of this country, but I think there is a consensus of opinion as to the ideal aim of secondary education. It must hold to the broad view if it be truly American.

The high schools have been called the "people's colleges"; the essence of their work is education, not specialization. I refer, of course, to the high school system of a community as a whole, not to the individual schools of a large community, which may differ a little from one another in the emphasis which they place upon certain lines of education. Thus we have in some communities a Latin school, an English high school, and a mechanic arts high school, named, you will expect me to say, in the inverse order of their importance to the community. But, seriously, I believe them to be equally important. These three make really one greater high school; their names merely indicate that a little greater emphasis is put upon this or that educational method. Separated in this way, they appeal to a greater number of youth, because of the fact that they offer, at least apparently, a choice of one of three methods of school activity. But they all make for the same general result, —namely, the unfolding of the latent powers of their students; that is, for education.

This is the chief aim of all high school systems. If it be suggested, as I am aware that it has been, that there are certain tendencies toward specialization in the high school in which mechanical operations are taught, I shall reply that those who make this charge overlook the real educational product of this system of teaching, and see only the *method* which is more visible, to be sure, but is, after all, only incidental. The aim of the manual training high school, to use an oft-repeated illustration, is not to make the box, but the boy. We must, of course, make the box as it should be made; we must allow no errors in the design or the execution;

we must not accept careless and slovenly work. The work must be tested by rule and square, and it must agree with the plan. The boy's work must be honest; it must be his own work; it speaks for itself; there can be no substitutions. If it is not up to the mark, up to the standard, the first time, it must be done over and over again until the necessary degree of perfection has been reached. And why all this pains? That the boy may know hereafter how to make boxes, coat-hangers, button-hooks, tool chests, tongs, hammers, lathe tools, and machines? By no means; at least, not chiefly that. Has he not learned patience, perseverance, accuracy, self-knowledge, self-reliance, manual skill and dexterity, and a hundred other invaluable qualities; in short, made himself more of a man? Of course, in doing all these things he has incidentally acquired a great deal of valuable information which will stand him in good service in any calling, and especially in one which requires the use of implements and machines, with which he has incidentally become acquainted. After he has received as much of the all-round education as the school can give,—that is, after he has been educated, so far as the school can educate him in the broad sense of the word,—then he may specialize along the same lines of work that the school has made use of in developing his powers, or along other lines, and thus supplement his education.

But the chief aim of all these secondary or high schools, whatever their names, is, and should be, to give that sort of education which will enable the student to enter upon his special training after as broad a general training as it is possible to obtain; and the more complete this preliminary general training,—*i.e.*, the more perfectly educated he is in the proper sense of the term,—the higher will be his success in his professional studies and work.

On the other hand, what is the function of the dental school, or the professional school in general? It is certainly not education in a broad sense. It should not be called upon to continue the work of the preparatory school. The student who enters the professional school does so to prepare himself to perform with intelligence and skill the various tasks of the profession which he has chosen; to master its special problems, and to place himself, if possible, among the leaders in his line of work. To do this will require that all the time at his command be employed in supplementing any previous intellectual or manual power that he may have cultivated by special training along the lines demanded in his chosen field of work. He ought not to be obliged to inform himself for the first time upon the general principles of those departments of knowledge which are fundamental to this, as well as many other professions; and certainly he ought to have cultivated before this a certain general command of himself, both of his intellectual and his manual powers, in order to take advantage of the facilities now offered for special training.

There are certain psychological reasons for this which I may refer to later, but my present object now is to define the proper functions of the professional school. I must admit, of course, that I may be describing an ideal. I suspect that the faculties of dental schools, as well as those of all professional schools, have commonly found it necessary to supply the deficiencies of preparatory education; that they have been obliged to teach more or less of general physics and general chemistry, of Latin, of the principles of mechanical operations; but it ought not to be so. Professional schools ought to receive their pupils already educated, if I may venture to put it that way for the sake of clearness, and without contradicting the general truth that education can never be completed. It is not the business of the professional school to educate, in the strict sense of that term. All professional schools, in planning their courses of study, recognize this principle, and only supply such education as is demanded by the student to supplement his earlier training. They confine themselves, if they are worthy of the name of professional schools, to professional work as closely as is found practicable, recognizing the right of every student to secure as complete and perfect a general education as possible in the preparatory secondary school or college, and also his right to secure the greatest economy of time and the greatest possible efficiency of special training under expert guidance before taking up business as a practitioner. And not only is it *his* right, but it may be justly demanded by the community which the professional school is to serve through its graduates that there should be the highest perfection of training in such schools. Moreover, at the period of life when professional training is secured time is immensely valuable, and, with the highest professional success in view, there is no time to be given to any but professional studies.

With this view of the just demands of the professional school upon the preparatory school, it is easy to see that there is a tremendous responsibility laid upon secondary schools. It is their business to furnish the candidate for the professional school all the general education which, strictly speaking, he is to receive. There are, of course, a few favored ones, who, starting from the kindergarten, may pass through all the stages of primary, secondary, college, and even university education, and thus receive the most liberal training possible before entering professional work; but, for the most part, professional study breaks in before the university, and oftentimes before the college; and it is our present purpose to discuss the question, What sort of secondary education can furnish the best all-round training for the professional school, and particularly the dental school?

To pursue successfully the study of dentistry, what knowledge is required? What special abilities and powers should the students have in order that they may be considered fitted to undertake this kind of professional study? I cannot go much into detail, and that, perhaps, is unnecessary. It need not be said, at least, that the young dental student needs to be informed upon the general principles of the fundamental sciences, physics and chemistry, physiology and hygiene; that he should have a good working knowledge of the English language,—that is, the ability to gather knowledge readily from books and lectures, and record his observations and notes in clear, concise, and comprehensive language; that he should have, perhaps, a working knowledge of Latin, and either French or German, or both. These may be said to be the academic necessities, and every thoroughgoing high school, whether of manual training type or of the purely academic kind, should meet these requirements. But there are other qualifications which are implied in the term "education" quite as essential, and even more fundamental; and it is these which my theme leads me to speak of more particularly. I refer to the *power* which is developed by education; that is, the ability to observe, discriminate, reason, and co-ordinate muscular movement under the direction of the will. An educated man is one who has cultivated all his powers, and can direct them to the highest service in whatever field his work may be. Now, the time when these various powers are best cultivated is during youth. This is especially true of the motor powers. It is a well-known principle of modern educational theory that the basis of mental training is to be found largely in the motor activities, and these must be exercised in the earliest years. We must not deceive ourselves with the idea that the result of manual training is mere dexterity of hand movements. It is that, of course, and much more; it is *mental power* as well.

We are apt to think of the mind as lying in the gray matter of the skull, but I think it would be much more nearly correct to say that the mind extends to the finger tips, and that the training of the intellectual and the manual powers is essentially one and the same thing. It is certain that the proper training of both these powers demands that they should be called into play by timely exercise. In the affairs of every organ of the body it must be recognized that there is a tide which, taken at the flood, leads on to fortune, but which if neglected at the critical time leaves the organ more or less hopelessly stranded; and in the case of the hand, more than in any other organ, the tide is in flood during the years of primary and secondary education.

Writing masters claim that children who are left to a certain age without instruction can never afterward be taught to write with grace and fluency. If we examine the biographical accounts of those who have achieved eminence in art, we shall find that they have all felt the impulses for manual expression in early life, and exercised them when still very young. It is not always safe to argue from examples of genius, but it seems to me that we may get a powerful suggestion for early hand training from the fact that the great artists—although in many of them we may trace hereditary tendencies—almost invariably exercised their powers of manual expression at a remarkably early age. One recalls how Giotto was discovered sketching one of his sheep on a stone when he was only ten years old; how Gainsborough painted landscapes well when scarcely fourteen; how Turner exhibited in the Royal Academy at the age of fifteen; how Sir Edwin Landseer gained a prize at the Society of Arts at the age of thirteen; how George Moreland had pictures accepted when scarcely ten; how Thorwaldsen had a reputation as a carver when thirteen, and so we might go on indefinitely.

I have been informed recently that in the development of dentistry the most successful of the early practitioners began life as apprentices in jewelers' shops. It would not be difficult to show that in every employment in which manual dexterity is important, those who are most proficient have received this sort of manual training very early in life; and it might also be shown that the hand is always awkward and unwieldy when left untrained in youth.

But such observations are not the only grounds for urging the importance of early training of the hand, or, to speak more correctly, *through* the hand. There are psychological reasons for it. The great principle of motor education lies at the basis of the whole matter. I cannot go into this subject extensively at this time, but I will refer to a few facts which have been established as indicating the direction the argument for manual training should take.

It was established by the researches of Ferrier and others that the brain is not, as at one time believed, a single organ acting as a whole, but a group of organs, capable of more or less independent action. Roughly speaking, the brain may be divided into three areas, the one sensory, the other motor, and the third neither the one nor the other, so far as can be demonstrated. And it has been further shown that the motor area, which lies in the middle of the brain, is made up of a number of distinct centers, governing groups of muscles, and producing definite movements upon excitation. This was most clearly proved by Ferrier's experiments. An animal was chloroformed, the top of the skull removed, and the brain dissected so as to expose this motor area to view. The experimenter then, by touching certain points on the surface of the part of the brain with the poles of a galvanic battery, produced with absolute precision whatever movement was desired.

When a monkey was experimented on in this way, the excitation of a particular convolution of this motor area would cause either the fist to be clenched, the tail to be moved, the tongue to be protruded, the lip to be puckered, or the nostrils to be distended. In short, any movement of any part of the head, trunk, or limbs, even the minutest movements of the mouth and eyes, could be produced by exciting the nerve-tissue of the brain at the proper point. So precisely did these movements agree with the predictions of the experimenter that those who witnessed the demonstration could scarcely believe that there was not some ingenious trick about it. But there is no question that Ferrier did produce, by galvanic excitation of the motor area of the monkey's brain, nearly every muscular movement of which the animal had ever been capable.

We are not obliged, however, to draw all our inferences from the study of the brains of the lower animals. Since the experiments of Ferrier, and under the stimulus of the suggestions derived from his work, an enormous collection of observations upon the human brain has been gathered together, so that we may scientifically affirm that there is a large area in the middle of the human brain which is made up of motor centers, and among these centers there is a series or group which presides over the muscles of the arm and hand. This study of the human brain has been lifted above vivisection into the departments of physiology and psychology, but the methods are none the less scientific. This necessary change in the character of investigations has increased rather than diminished the value and importance of the results obtained.

In applying the term "motor area" to the human brain, it must be noted that we use it in a special sense. It does not refer merely to the nerve origin of motion; the proper excitation of sections of the spinal cord will produce muscular motion. What is referred to as the motor centers of the brain is that area, or a part of it, which is the spring of movement dictated by the will,—*i.e.*, voluntary movement involving the expression of thought, or emotion, or the gratification of some desire. It is more than this. It is the repository of all knowledge which muscular activity has ever put us in possession of, and it needs hardly to be stated that much of our knowledge has been acquired by muscular action. If we analyze any of our ideas, we shall see that there are very few of them which are of a purely sensory composition. A large part of every concept will be found to contain motor elements,—*i.e.*, those which have been acquired through movement of some sort. We need not take a bicycle for example, or a motor carriage. Take a book, which perhaps is the worst possible example. We think not merely of its color and the shape of the type, or of the thought it sets forth, but we think of the effort of holding it, turning the pages, the movements of the eyes back and forth in reading, the effort of carrying it, and the hundred other simple elements which involve nothing but actual movements.

It is unnecessary to multiply examples. It is almost self-evident that brain motor centers, whose existence has been experimentally demonstrated, must constantly take an indispensable share in our mental life. It is perhaps not too much to say that the mind would be impossible without them. Conceive of a being endowed with the special senses of sight, hearing, taste, and the feeling of warmth and cold; in fact, all those means of receiving impressions from without with which every normal babe is potentially endowed, excepting the muscular sense and the power of motion. And then imagine further the character of the ideas of the world that such a being would derive. The case is almost too extreme to imagine, for some muscular action would have to be conceded in order that it might have the power to exercise the sense of vision, otherwise there could never be anything but a sensation of varying lights and shades, with no location and little or no connection,—*i.e.*, no real vision. We have allowed our imaginary being the sense of hearing, but evidently it could not exercise the power of speech even of the most rudimentary sort. It is needless to say that we have imagined a being capable of about as much thought as a dead oyster.

Perhaps this illustration is needlessly fundamental, for to eliminate all muscular activity is to depart a long way from the conditions furnished by the problem of education; but it may serve the general purpose to show to what lowest terms the complex mind would be reduced if entirely deprived of connection with muscular activities. This point needs no argument. It is plain that the normal mind must require functional activity in motor centers in order to acquire its general functional power, and it need not be pointed out that the hand must play a most important part in this activity. In touch, in a thousand different combinations of movements, it adds enormously to our mental resources, and gives us a means of expression second to no other in importance. Indeed, the evolutionist has pointed out that man's high place in the animal kingdom is due to his peculiar endowment with manual power.

There can be no doubt that the youth of our species in all time have had abundant training through motor education as determined by environment and chance. But we are concerned with education in a different sense. Have we any evidence that anything more in this line is desirable than the ordinary activities of life, such contact with objects, such use of implements, and such undirected exercise as comes from games and the common tasks of youth? In answer to such questions much has been written from observation, considerable from imagination, and a little from experimental psychology. I have seen nothing more definite than the report of certain experiments which Dr. Edward W. Scripture, of Yale University, made to the American Manual Training Association last June. I will quote from this report as briefly as possible.

His first thesis is "that practice of any activity develops the will for that activity." This is enforced by a well-known example: "Let the practice be in raising dumb-bells, or in striking blows at the forge with the hammer; the power to do this steadily increases. Is it the power of the muscle or the will power? It is undoubtedly both. The muscle develops to a certain extent; it increases in size and firmness. But in properly arranged work the increase in power continues after the muscle has reached its full development, and often does so quite out of proportion. In the gymnasium it is a well-known fact that the muscles will often show very little increase in size and firmness, whereas the pupil will develop rapidly in power. Practice in a voluntary action develops the will as far as it is concerned with that act.

"There are other properties of voluntary acts—quickness, steadiness, gracefulness, etc.—to which we can apply the same reasoning. Our final conclusion is that the development of our voluntary activities by practice is largely a development of the particular force of will involved, and also that to develop the will in these particulars the proper method is to employ exercise for voluntary movements. Thus exercises like marching, dancing, swimming, and physical sports, also sketching, painting, clay-modeling, forging, wood carving, etc., are exercises to be employed for developing will."

The first thesis will be easily admitted, but the second is not so evident, and needs experimental verification. The proposition is that "the development of the will in any way involves a development in other ways,"—*i.e.*, practice at the forge might directly help to make a forcible preacher. One thinks of such examples as Robert Collier at once, and is inclined to accept the thesis without question; but that would be a hasty conclusion. Possibly other causes operated, and forging had nothing to do with it. Dr. Scripture seeks scientific verification, and here it is:

He says, "Some years ago one of my pupils made some experiments with a dynamometer, in which on the first day she squeezed as hard as she could with her left hand, and then with the right hand. The pressure was registered as thirty inches of mercury for the left hand, and twenty-nine for the right hand. Then every day for more than a week afterward she practiced squeezing with the right hand only. The records ran 34, 36, 37, 41, 45, 47, 49, 49. On the last day the left hand, which had not been practiced at all, was again tested, giving a record of 42. Thus the left hand had increased in power by practice with the right. This phenomenon I named at the time 'cross-education.'

"Another pupil tried the experiment of seeing how often she could stick a needle on the end of a stick into a certain hole of a brass plate. On the first day she succeeded fifty per cent. of the times with the left hand, and sixty-one per cent. with the right. Thereafter she practiced the right hand, with the results on successive days of 61, 67, 65, 75, 74, 75, 82, 79, 78, 88 per cent. On the last day the left hand was again tried, with a record of seventy-six per cent. Here again was a case of cross-education.

"Practice of one limb of the body develops the symmetrical limb. But what is developed? In the case of the latter experiment, it cannot be anything muscular; it must be action of the nerve-centers governing the movement. In the case of strength I have direct proof from experiments by another student that the muscles of the unpracticed arm do develop slightly, but not in proportion to the development of power.

"Six subjects were chosen; definite girth measurements of both arms were taken, and the number of times ascertained that each arm could raise a weight of five pounds. A dumb-bell was given to the subject, who was instructed to lift it from a position where the arm hangs extended downward and the weight is supported from the shoulder to one where the arm is flexed and the weight is close to the shoulder. In this movement the elbow remains stationary. Hence, to accomplish this act, the biceps is employed almost wholly, though the muscles of the forearm are also used to a lesser extent in gripping the dumb-bell. The right arm alone was practiced for a considerable time. The result was, the right biceps gained largely in size, and the left biceps less, whereas the left arm, as well as the right, gained greatly in power.

"Now let me tell you of still another experiment. Telegraph keys were so arranged that they registered the rapidity with which a person could tap them. On the first day both index fingers and both big toes were tested. After that the right big toe alone was practiced for over two weeks. Then all were tested again. Four of the persons tested gained on an average in the power of the right big toe thirty-three per cent. The unpracticed left big toe gained thirty-one per cent.; the right index finger gained twenty-one per cent., and the left index finger thirty-one per cent.

"These experiments establish the fact of radiating practice, a more important and higher principle than that of cross-education. What can we conclude from this? I believe that we can support the hypothesis that, physiologically speaking, the development of the center governing a particular member causes at the same time the development of higher centers connected with groups of members. Physiologically speaking, development of will power in connection with any activity is accompanied by a development of will power as a whole."

These experiments by Dr. Scripture are offered merely as illustrations of the peculiar connection between muscular exercise and the development of mental power. They limit the thought to one kind of mental power,—viz, the exercise of the will,—but they suggest much more. So far as they go, they are interesting experimental verifications of educational principles which have long been known. The educational value of hand training already rests upon high authority.

Says Rabelais, "Teach through the senses; train for practical life."

And Bacon, "Education is the cultivation of a just and legitimate familiarity betwixt mind and things."

Comenius, "Schools have been fitly called the workshops of humanity."

Pestalozzi, "Man must seek his chief instruction in his chief work, and not allow the empty teaching of the head to precede the labor of the hand."

Frœbel, "What a man tries to do, he begins to understand."

Dr. Henry Maudsley, "To know the truth it is necessary to do the truth."

John Ruskin, "Let the youth once learn to take a straight shaving off a plank, or draw a fine curve without faltering, or lay a brick level in its mortar, and he has learned a multitude of other matters which no lips of man could ever teach him."

These are weighty opinions upon the real essence of education, the fruitage of wise experience and pre-eminent insight.

With such definitions of education as I have all too crudely outlined as the essential inspiration of the modern high schools in which the manual arts form a considerable part of the instruction, is it not fair to expect a kind of training that will result in just the sort of preparation that is needed for the dental college? The secondary schools will not grow less efficient than they are. They have constantly improved, and will continue to advance with the growing demands made upon them. I am not sure but we shall at no distant day have greater reasons than now for calling them the people's colleges. Apropos of this, I will read, if you will allow me, from a paper read by Dr. Thomas M. Balliet before the American Association for the Advancement of Science last August, and with this I will leave the question with you:

> "Good public high schools give a training to-day, in their four years' courses, which is quite equivalent to the training our best colleges were able to give forty years ago; the quality of the teaching is higher and the facilities for teaching the natural sciences are better than was the case in our colleges at that period.
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> "Our larger colleges are now doing strictly college work during the first two years, and attempt to do university work during the last two. The work

of the first two years of the college could be done more successfully in our high schools, where the numbers are small per teacher, and effective classroom instruction is possible.

"Such university work as is attempted during the last two years of the college course could be done far more effectively by the universities which possess the extensive and costly equipments necessary for thorough university work and which our colleges do not have. Through such a readjustment at least one year could be saved without injury to the cause of higher education.

"The effect of such a change would be a happy one on the cause of secondary education. It would bring the advantages of what would be virtually a college education to the doors of the masses of the people. It would reduce the cost of preparation for the university and the professional school at least one-third by enabling students to make this preparation at small expense near their homes. It would as a consequence open the way to the university for many capable young men and women to whom it is now closed.

"The saving to the community in which a high school of the grade indicated should be located, would be very considerable, and it is this fact which would probably win popular favor for the plan. I happen to know of a city with a population of about fifty-seven thousand, from which there are at present some eighty students in attendance in the first two classes of various colleges. The average expense annually to their parents is not less than five hundred dollars, and is probably more. The total cost of educating these eighty students is therefore at the lowest estimate forty thousand dollars per year. In this same city the addition to the teaching corps of the high school required to teach these students quite as effectively as they are taught in the colleges, could be provided for at most ten thousand dollars. The cost of board for these eighty students at their homes during the period of the college year would probably not exceed nine thousand dollars, thus making the total cost of educating them at home nineteen thousand dollars, and saving annually twenty-one thousand dollars. I believe the time is not far distant when the best public high schools in this country will occupy a position in our educational system not very unlike that of the Gymnasium and Real Gymnasium in Germany and that of the Lycee in France, and when our stronger colleges will be converted into universities and our weaker colleges into academies of high school rank."

THE DENTIST AND PER CENT.

BY G. B. SQUIRES, PH.G., D.D.S., SOMERVILLE, MASS.

After the article, "Dentists as Prescription Writers,"* was published the author received several letters from dentists, asking for information in regard to per cent. In the Dental Cosmos for June, 1898, there is a short editorial, in reply to queries, on the same subject; showing that there are many dentists who do not understand the meaning of per cent., and therefore are unable to prepare a certain per cent. solution of a substance or to find the amount of a substance in an already prepared solution of known percentage.

A professor in one of our dental colleges, while delivering a lecture to the senior class, informed them that two and a quarter grains of cocain hydrochlorate in a dram or eighteen grains in an ounce of water made a four per cent. solution. This statement, although practically correct, is rather arbitrary, and subsequent conversation with the class showed that only a small minority knew why it required this particular amount to make a four per cent. solution.

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*Dental Cosmos, March, 1899.

In the editorial previously referred to there is a paragraph which reads thus: "The Troy ounce of water, however, weighs 455.69 grains, so that if the percentage solution were to be made by weight, a one per cent. solution would be made by adding 45.6 grains to one fluidounce of water." The above statement is not correct,—evidently a misprint,—but the present writer ventures to make the statement that a good-sized minority of the readers of that article took the figures for granted, and would not have been able to verify them if they wished. As a matter of fact, one per cent. of 455.69 grains is 4.5569 grains, or, by expressing it approximately, by cutting off three of the decimal figures, 4.5 grains instead of 45.6 grains.

The following is an attempt to review certain rules in percentage, which all dentists probably learned while in the grammar school, but which they now fail to apply practically. There are some who seem to think it a complicated process to find, for example, the amount of cocain hydrochlorate in an ounce of a four per cent. solution, but who could easily figure it out if they realized it was merely a simple example in percentage.

Per centum is from the Latin *per,* by, and *centum,* hundred, meaning by the hundred. Therefore, percentage is the process of computing in hundredths. The percentage of a quantity is so many hundredths of it, as is indicated by the per cent.,—*i.e.,* two per cent. of a quantity is the same as two-one-hundredths of the quantity. For example, a two per cent. solution means that there are two parts of a certain substance in one hundred parts of the solution, or, in other words, two-one-hundredths of this solution is composed of this particular substance.

Then, if per cent. is the number of hundredths, we may express it in the form of a decimal or common fraction,—*e.g.,* one per cent. may be written .01 or $\frac{1}{100}$; five per cent., .05 or $\frac{5}{100}$; ten per cent., .10 or $\frac{10}{100}$, and so on. The decimal form is generally employed in getting percentages, it being the shorter method. Let us get two per cent. of one hundred grams both ways. Expressed in the form of a common fraction, the process is simply the multiplying of a whole number by a fraction, and this is done by multiplying the whole number by the numerator and dividing the product by the denominator; thus: $100 \times 2 = 200$, and $200 \div 100 = 2$; the number of grams in a hundred to represent two per cent.

Expressed decimally, it is the multiplying of a whole number by a decimal fraction. The rule is: multiply as in whole numbers, pointing off as many decimal places in the product as there are decimal places in the multiplicand and multiplier,—*e.g.,* $100 \times .02 = 2.00$; the number of grams in a hundred to represent two per cent. Always bear in mind the decimal point in getting percentages. Two per cent. cannot be written thus: .2; this would be two-tenths or twenty-one-hundredths, which is twenty per cent., and is expressed decimally thus: .20.

Now, if we all used the metric system (the only proper and scientific system), it would be simply a case of multiplication in making any per cent. of an aqueous solution of a solid, because the unit of dry and liquid measure corresponds,—*i.e.,* one cubic centimeter of pure water at its greatest density weighs one gram. For example, to make 30 cc. of a five per cent. solution of cocain hydrochlorate we proceed thus: 30 × .05 = 1.50, one and fifty hundredths, or one and one-half grams, being the amount of cocain hydrochlorate to use.

But when we use the apothecaries' weight and measure we find that the unit of weight (the grain) and the unit of measure (the minim) do not correspond,—*i.e.,* one minim of water at its greatest density does not weigh just one grain, but a little less. One fluidounce of water contains 480 minims, but this will not weigh one troy ounce, or 480 grains, but 455.6 grains. Then it necessarily follows that if we weigh one substance and measure the other, we must convert the measured substance into weight before figuring the percentage. For example, to make a fluidounce of three per cent. cocain hydrochlorate we would take the equivalent of a fluidounce in grains, which is 455.6, and multiply by three, thus: 455.6 × .03 = 13.668, the amount of cocain hydrochlorate to use—practically thirteen and one-half grains. If you wished to make only one dram of the solution, get one-eighth of 455.6, or 56.95, practically fifty-seven grains; multiply this by three, thus: 57 × .03 = 1.71, practically one and three-quarter grains. To get a three and one-half per cent. proceed the same, 57 × .035 = 1.995, practically two grains.

It is customary in making ordinary aqueous solutions to measure the liquids and weigh the solids, but we could weigh both, and then there would be no converting,—*e.g.,* to make one troy ounce of three per cent. solution proceed thus: 480 × .03 = 14.40. Take 14.40 grains and add water to one troy ounce (480 grains), and we have a three per cent. solution, as in the previous example, but the finished product is not the same. In this case we have made a little more than a fluidounce.

If we were using a two per cent. solution of cocain hydrochlorate for injection in tooth-extraction and our syringe held one-half dram (30 minims), to find the amount of cocain hydrochlorate in each syringeful we would take the equivalent of thirty minims in grains, or 28.5, and multiply by .02, thus: 28.5 × .02 = .570, five hundred and seventy thousandths or fifty-seven hundredths, practically one-half grain.

Dentists should be able to reduce from a higher to a lower per cent., especially now that formaldehyd is being used quite extensively. Formaldehyd is found commercially in a thirty-five to forty per cent. aqueous solution. This is too strong for ordinary use. If our solution is forty per cent. strength, it is a simple matter to reduce it one-half with water and get a twenty per cent. solution; double this quantity again with water and get a ten per cent. solution, and so on. But if your solution is thirty-five per cent., and you wish to reduce it to a three and one-half per cent., for example, the process by the above method would not be so easy. There are several rules for reducing from a higher to a lower per cent., but the following is probably as simple as any. It is stated in proportion, according to the rule of three, thus: The per cent. of the stronger is to the per cent. of the weaker, as the quantity of weaker desired is to quantity of stronger required to produce it.

Now, to make a fluidounce of three and one-half per cent. formaldehyd from a thirty-five per cent. we would state it thus: 35 : 3.5 : : 480 : X. To find X, or the unknown quantity, we multiply the second and third terms and divide the product by the first term, thus: 480 × 3.5 = 1680.0, and 1680.0 ÷ 3.5 = 48. Forty-eight minims, the amount of the thirty-five per cent. solution to use in an ounce of water to make a three and one-half per cent. solution. We convert the ounce into minims in the proportion, so as to get the product or unknown quantity in minims, instead of in a fraction of an ounce. Another: to make sixteen fluidounces of a seven per cent. solution from a thirty-five per cent.—35 : 7 : : 16 : X—16 × 7 = 112, and 112 ÷ 35 = 3.2. Three and two-tenths ounces, the amount of the strong to use.

Every dentist should have a knowledge of at least these two forms of percentage, and be able to figure them out himself and make the solutions, if necessary, without recourse to his apothecary.

A CASE OF ACUTE HEMATOGENIC CALCIC PERICEMENTITIS.

BY CLARENCE J. GRIEVES, D.D.S., BALTIMORE, MD.

(Read before the Union Meeting of the Virginia State Dental Association, District of Columbia Dental Society, and Maryland State Dental Association, May 11, 1900.)

A RECENT authority has said that "clinical observation is becoming proverbial for its unreliability."

Clinical observation is more *en evidence* in this paper than scientific data, much to the writer's regret. The case, however, is both unique and interesting, and we hope that what is lacking in facts may be more than amplified in the discussion to follow.

The patient, Mrs. W., whom the writer has served for the past seven years, is of excellent habits, unusual intelligence, and has been during that time fairly healthy. A superb denture, in excellent occlusion, with caries in the minimum, displayed results of untiring attention on the patient's part.

No extensive fillings nor pulpless teeth; little salivary calculus, and but two slight attacks of pyorrhea are to be recorded.

Here follows the patient's history; that of the family is given later in detail.

Female, married, no children, age thirty-five, weight one hundred and forty-five pounds, and of florid complexion, inclined to be fleshy; frequent, but slight, muscular rheumatic pains; extreme headaches, partially relieved by glasses; inflamed pharynx, chronic, but little improved by uterine treatment; indigestion not unusual; kidneys occasionally inactive; chronic congestion of the uterus; menses irregular, with much pain.

The patient was seen at the end of the sixth day of the present indisposition. The pharyngeal and oral mucous membranes were highly inflamed, presenting in the pharynx the appearance of acute follicular pharyngitis. Temperature ranging from 101 F.-102 F. and 103 F. on the sixth day; acute and continuous pain along the right superior maxillary branch of the fifth pair. Physician in attendance had diagnosed the case as grippe, tonsillitis threatened, and exhibited large quantities of quinin. sulf. and antikamnia without relief. Examination of the mouth displayed the membranes and gingivæ acutely inflamed, unattended by pyorrhea or recession. The denture presented no new caries; pulpitis and periodontitis from pulp sepsis were absent; in short, no dental lesions whatever.

Periodontitis and two pronounced swellings over the apices of the palatal roots of the second and third right upper molars simulated alveolar abscess. Isolated, these teeth responded to the temperature test, showing healthy pulps.

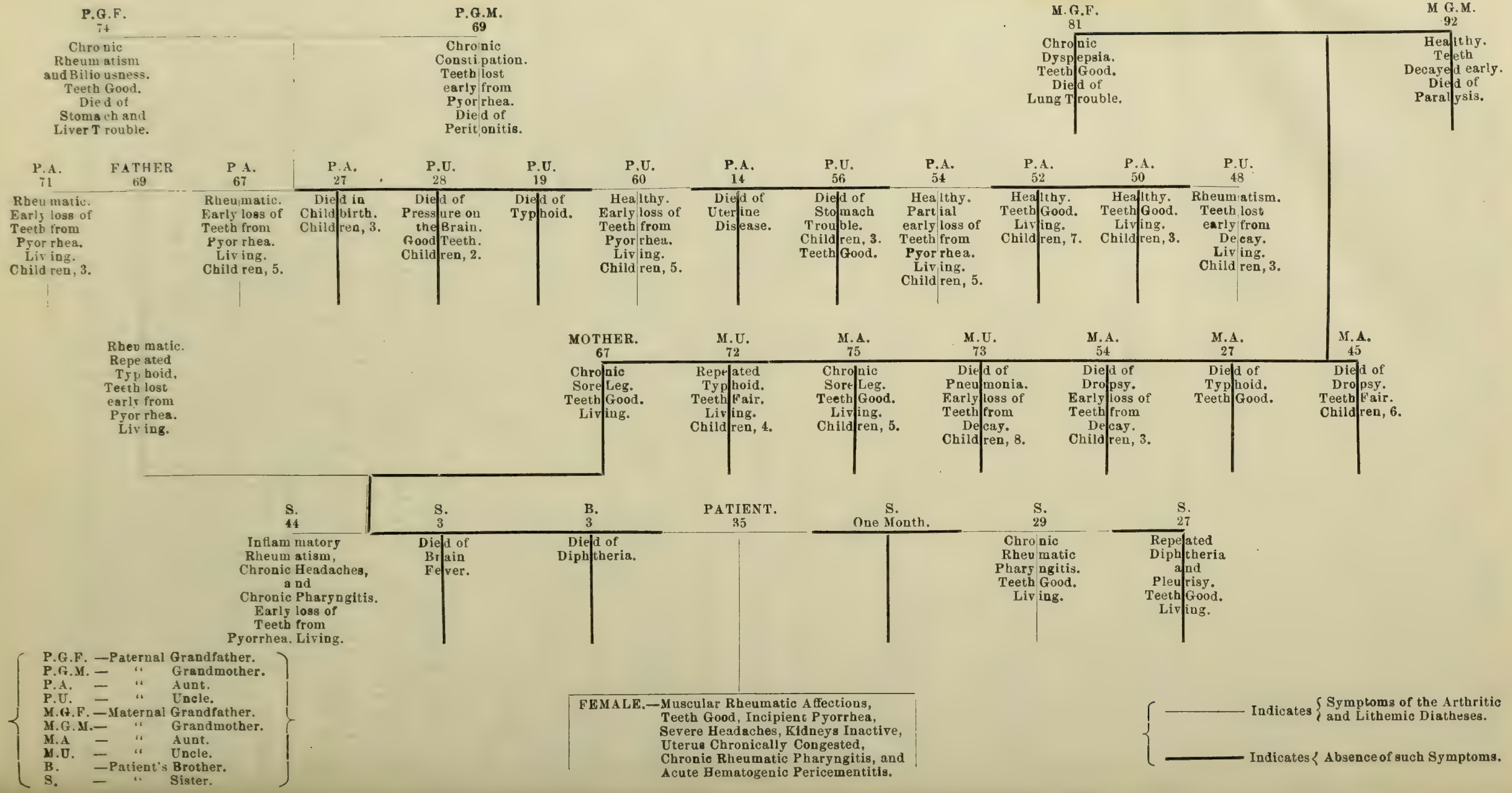
A most careful and searching examination of the gingivæ adjacent to these swellings developed absolutely no connection with the oral cavity; no pyorrhea, no fistulæ; in fine, no point for pathogenic infection. Incision of the swellings by bistoury, high on the palatal arch over these roots, brought a free discharge of sanguineous fluid, much blood, and such a small quantity of pus as to imply a doubt of its presence. The palatal alveolar wall was completely absorbed opposite the upper two-thirds of the palatal roots of these molars, although apparently intact at the cervical attachments. The visible root-surfaces, which were literally covered with typical serumal calculus, were carefully cleansed, the wounds dressed, and almost immediate relief followed.

The next few days found the patient's temperature at normal, and complete recovery was apparently in view. Two days later the case presented an exactly similar train of symptoms, with two large swellings opposite the middle third of the palatal aspects of the roots of the right upper first molar and second bicuspid, the trouble apparently progressing to the median line. Again suffering was relieved by the same local treatment. Phenacetine and sodium salicylate liberally exhibited, followed by lithia citras in the hands of a more able medical practitioner, produced excellent results. Again a multiple coarse serumal deposit was removed, and again the alveolus had been absorbed, but not at its gingival border. While very slight deposits were discovered on the cervices of the anterior teeth, none were apparent on the cervices of the teeth affected; the pockets opened had absolutely no connection with the oral cavity save that made by operator.

After three weeks on salicylates and lithia, the muco-periosteum over the palatal roots had apparently healed, showing little loss of tissue; the gingivæ were firmly attached, and the mouth comparatively normal. Careful attention to diet and a free use of copious draughts of water and lithia and occasional doses of salicylates is the treatment which has promoted a state of health to date.

Three analyses of the night and morning urine during the second attack, made by the physician, produced only a very slight excess of uric acid in two out of the three; all displayed an increase in specific gravity.

The many hematogenic deposits, which in the last attack were


P.G.F. 74
Chronic Rheumatism and Biliousness. Teeth Good. Died of Stomach and Liver Trouble.
P.G.M. 69
Chronic Constipation. Teeth lost early from Pyorrhea. Died of Peritonitis.
M.G.F. 81
Chronic Dyspepsia. Teeth Good. Died of Lung Trouble.
M G.M. 92
Healthy. Teeth Decayed early. Died of Paralysis.
P.A. 71
Rheumatic. Early loss of Teeth from Pyorrhea. Living. Children, 3.
FATHER 69
Rheumatic. Repeated Typhoid. Teeth lost early from Pyorrhea. Living.
P.A. 67
Rheumatic. Early loss of Teeth from Pyorrhea. Living. Children, 5.
P.A. 27
Died in Childbirth. Children, 3.
P.U. 28
Died of Pressure on the Brain. Good Teeth. Children, 2.
P.U. 19
Died of Typhoid.
P.U. 60
Healthy. Early loss of Teeth from Pyorrhea. Living. Children, 5.
P.A. 14
Died of Uterine Disease.
P.U. 56
Died of Stomach Trouble. Children, 3. Teeth Good.
P.A. 54
Healthy. Partial early loss of Teeth from Pyorrhea. Living. Children, 5.
P.A. 52
Healthy. Teeth Good. Living. Children, 7.
P.A. 50
Healthy. Teeth Good. Living. Children, 3.
P.U. 48
Rheumatism. Teeth lost early from Decay. Living. Children, 3.
MOTHER. 67
Chronic Sore Leg. Teeth Good. Living.
M.U. 72
Repeated Typhoid. Teeth Fair. Living. Children, 4.
M.A. 75
Chronic Sore Leg. Teeth Good. Living. Children, 5.
M.U. 73
Died of Pneumonia. Early loss of Teeth from Decay. Children, 8.
M.A. 54
Died of Dropsy. Early loss of Teeth from Decay. Children, 3.
M.A. 27
Died of Typhoid. Teeth Good.
M.A. 45
Died of Dropsy. Teeth Fair. Children, 6.
S. 44
Inflammatory Rheumatism, Chronic Headaches, and Chronic Pharyngitis. Early loss of Teeth from Pyorrhea. Living.
S. 3
Died of Brain Fever.
B. 3
Died of Diphtheria.
PATIENT. 35
S. One Month.
S. 29
Chronic Rheumatic Pharyngitis. Teeth Good. Living.
S. 27
Repeated Diphtheria and Pleurisy. Teeth Good. Living.
P.G.F. —Paternal Grandfather.
P.G.M. — " Grandmother.
P.A. — " Aunt.
P.U. — " Uncle.
M.G.F. —Maternal Grandfather.
M.G.M.— " Grandmother.
M.A — " Aunt.
M.U. — " Uncle.
B. —Patient's Brother.
S. — " Sister.
FEMALE.—Muscular Rheumatic Affections, Teeth Good, Incipient Pyorrhea, Severe Headaches, Kidneys Inactive, Uterus Chronically Congested, Chronic Rheumatic Pharyngitis, and Acute Hematogenic Pericementitis.
Indicates { Symptoms of the Arthritic and Lithemic Diatheses.
Indicates { Absence of such Symptoms.

carefully collected and set aside for examination, were lost through the stupidity of a servant. This is much to be regretted, as they might have proved the key to the whole situation.

Seven years prior to this acute attack the patient, during a chronic pharyngitis, developed two pyorrhea pockets on the distal aspects of the roots of the third upper molars; cervical serumal deposits were removed, and local treatment proved sufficient.

The catarrhal condition of the pharynx indicated a throat specialist, who failed to remedy the pharyngeal inflammation, but, finding some optic defect, *partially* relieved the continuous headaches by applying glasses. The continued inflammation of the pharynx was diagnosed as a hystero-neurosis, associated with a congested uterus. A long course of treatment relieved perfectly the uterus, but the throat continued inflamed. The denture was seen frequently, with comparative immunity from caries and calcic deposits. Four years later, or three years from the present attack, a general, but not a deep-seated, pyorrhea appeared. No deep pockets, little if any pus, and slight deposits developed, and the case readily responded to local treatment with tartarlithine systemically. A form of typhoid malaria, from which the patient apparently recovered, preceded the present indisposition about four months.

Recognizing the discrepancies which creep into family histories depending for their data on the statements of the patient, this history is cited as of value because of the unusual intelligence of the family and the light it sheds on the accompanying lesions.

Here follows the family history. Summarized with the patient in view, this history develops some most instructive points:

Paternally.—Eleven out of thirteen children lived beyond the nineteenth year. Six of these eleven, whose parents displayed rheumatism paternally and pyorrhea maternally, were distinctly rheumatic, and five out of these six combined rheumatism and early loss of teeth from pyorrhea. The remaining five were free from both rheumatism and pyorrhea.

Maternally.—Seven children displayed no rheumatism, some caries, and no pyorrhea; no rheumatism nor pyorrhea in either parent.

In the immediate family of the patient, of seven children, three children died during or before the third year. Three out of the four remaining had an apparently incurable chronic pharyngitis. Two of these three added to their pharyngitis rheumatism and pyorrhea. That chronic pharyngitis, associated with rheumatism and pyorrhea, should appear in the third generation is rather more than an accident.

It is recognized that this chronic pharyngeal history might have been produced by hystero-neuroses associated with the uterus. In each case the gynecologist pronounced a cure of whatever uterine disturbance may have existed, and the pharynx remained inflamed, so this history marks these pharyngeal troubles as of rheumatic origin.

Of the family defects and diseases as allied to the etiology of pyorrhea alveolaris Talbot says, "The influence of heredity is generally left out of the consideration unless it be direct; which it rarely is, since heredity, as has been well remarked, is usually a prophecy rather than a destiny. It constitutes as a rule only a predisposition." ("Interstitial Gingivitis.")

Granting many discrepancies and defects, this array of hereditary facts has proven both a prophecy and a destiny, fulfilled "even unto the third and fourth generation."

Much has been accomplished, and much more surmised and written, on the subject of pyorrhea alveolaris, yet the investigator emerges from this mass of literature feeling like one of old, of whom it was said "the last state of that man is worse than the first." The writer hesitates in adding his convictions, but they are in some points original at least, and very necessary to the proper elucidation of this case.

The term pyorrhea alveolaris is recognized as notably defective and indefinite, covering "a multitude of sins." It is selected and here used in its broadest sense because of its universal application as a symbol of these conditions. Preference is given to Rhein's nomenclature in expressing the multiple stages of these lesions. *Pyorrhea simplex,* embracing all cases of purely local origin responding to local treatment. *Pyorrhea complex,* where the condition develops as the expression of a constitutional state or nutritional disorder; as an occurrence during acute disease or as the local result of the action of certain drugs or reflex neuroses. (Rhein, "An Etiological Classification of Pyorrhea Alveolaris," DENTAL COSMOS, 1894.)

Pyorrhea simplex may be dismissed from this consideration with the ably-stated opinion of Broomell, in which we heartily coincide, "Local irritation from salivary calculus could never, in a person of good habits and wholesome constitution, produce any effect but a limited tumefaction of the parts in contact, the removal of the cause producing immediate cure. But if there be a degenerating taint, the same irritation would result in extended inflammation, general breaking down of the tissues, and a condition that would not readily succumb to treatment." (Broomell, "The Soft Tissues About the Teeth, Their Morphology and Pathology," *Items of Interest,* April, 1900.)

We would call your attention for a moment to the glands of the peridental membrane as the local factor *sine qua non—not directly from local pathogenic infection, but indirectly from general systemic infection and degeneration due to diathetic causes*—in pyorrhea complex.

Some time ago Black ("The Periosteum and Peridental Membranes") established beyond cavil the presence of a series of "true epithelial tubular glands" lying deeply in the pericemental tissue. They are described as imbedded in the cementoblastic layer adjoining the root-wall and completely surrounding the tooth from apex to the gingival gland, or gland of Serres, into which many ducts deliver their secretion. "The secretion from these glands is also the source of serumal calculus deposited around the necks of the teeth within the gingival space." (*Vide* Black.)

He again ("Fibers of the Peridental Membrane," DENTAL COSMOS, February, 1899), in beautiful micro-photographs, demonstrates these glands, and suggests the part they may play in pyorrhea alveolaris as follows: "It seems to me very certain that the disease which I have described as phagedenic pericementitis has its seat in these glands. It also seems to me that this disease is caused by some micro-organism, not yet identified, which has a special tendency to this tissue, as the bacillus of typhoid fever has a special tendency to Peyer's patches and the agminated glands of the small intestine."

The major portion of simple typhoid infection is, according to Osler, direct from the intestine. "The mesenteric glands and lymphatic apertures of the intestinal wall bear the brunt of the attack." (Osler, "Practice of Medicine.")

We infer from the above that Dr. Black's idea is that of *direct* infection of the peridental glands from the oral cavity, while the writer's thought is that of *indirect* or systemic infection or degeneration of these glands from some central source.

As to the question of a specific micro-organism as an etiological factor in pyorrhea alveolaris, the verdict seems to be that of the Scotch jury, "not proven." Many exhaustive researches by Miller, Sudduth, Talbot, and Carpenter have failed to develop a micro-organism which will comply with the conditions required by the laws of Koch.

Further, "The pathological evidence demonstrates that bacteria play the very subordinate rôle in this disease that they do in ordinary wound infection." (Talbot, "Interstitial Gingivitis.")

In *pyorrhea complex* is found a condition of the pericemental tissues and alveolus associated with every disease, toxemia or diathesis affecting nutrition, whether directly or by reflex neuroses. Associated pyorrhea with or without deposits from the ingestion, absorption, or inhalation of certain metals is frequent, and may be considered typical.

The selective action of mercury, lead, and the iodids for the peridental glands is well marked and most interesting. Its study should assist to a proper pathological classification of this disease. Mercury, for instance, acts directly and indirectly on these tissues; directly, by its deposition in the glandular substance from the circulation, inflammation and ulceration following; indirectly, as the cause (from its effect on the cerebral and spinal centers) of a series of reflex neuroses, causing absorption of the alveolus or a direct effect on the intima of the capillary vessels, producing an obliterating endarteritis; these may be combined.

To quote again, "These glands respond readily to many poisons, such as mercury, lead, and the iodids, introduced systemically; their substance and that of the peridental membrane becomes saturated with the metal, and destructive peridental inflammation frequently follows." This constitutes a true pyorrhea, usually without calcic deposits, but frequently accompanied, as in plumbism, by a direct deposit of the metal on the teeth. It is direct irritation of this chain of glands by these metals with frequent loss of the dental organs and alveolus. The lead, for instance, increases the glandular activity; appears as such in the gland, and later in the glandular secretion depositing in the gingival space.

What more convincing proof could be had of the prominence of the peridental glands in the etiology of pyorrhea complex than their efforts to free the system of a poison and its final deposition at the tooth cervix via their secretion?

Diseases depending on a specific germ, as syphilis, tuberculosis, typhoid, and malaria, have, like mercury, a direct effect on the general glandular system. May not the peridental glands be also affected? Surely they would suffer from toxins, either introduced or from auto-intoxication, and from defective metabolism affecting nutritional processes and preventing proper tissue waste. Is it not good logic to expect of these tissues, fatty degeneration in tuberculosis, suppuration in syphilis, and necrotic degeneration in typhoid, producing a true pyorrhea, with or without deposits? The absence of deposits means little or nothing, and depends entirely on a constitutional state which will produce calcic deposits directly, as in gout, or indirectly (as Talbot has shown) by reflexly effecting the absorption of the alveolus, the retention of calcic waste in the adjacent tissues, and its deposit on the teeth.

Many authorities note the fact that those acute and constitutional diseases which interfere with nutrition, and directly or indirectly prevent elimination of effete matter, as interstitial nephritis and diabetes, scurvy, chlorosis, anemia and leukemia, syphilis and tuberculosis, wasting fevers such as typhoid and malaria, and such conditions as auto-intoxication, pregnancy, amenorrhea, and dysmenorrhea, by toxic action on the cerebral and spinal centers, interrupt nutrition and affect the capillaries through the vaso-motor system.

A continued vaso-motor disturbance occurring independently, or associated with any of the above diseases, would apparently very early select, in a fibrous tissue tenanted by glands, the glandular element, producing eventually either congestion and inflammation or anemia and atrophy; it is but a step to destructive ulceration of the peridental membrane, or to calcic deposits in the atrophied or necrotic glandular tissue.

Eminent pathologists have directly associated a wasting of the alveolus and suppuration of the pericemental membrane with neurasthenia, degeneracy, locomotor ataxia, and paraplegia. That the reflex neuroses independently, or as the result of disease or diatheses, are responsible for a large percentage of pyorrhea complex there can be no reasonable doubt. That these neuroses are the direct cause of endarteritis obliterans, and the consequent absorption of the alveolar process, Talbot has fully proved.

Endarteritis obliterans, or obliterating arteritis, is a destructive inflammation of the capillary wall, which, it will be remembered, is almost exclusively formed from the intima of the artery; the diameter, or lumen of the vessel, is closed, and blood-stasis follows. In describing the causes of endarteritis and its effect on the tissues, Talbot says,—

"Irritation occurring from within results either from trophic changes in the system, from direct irritation, from toxemias, or from both interdependently. Under these circumstances, a germ disease or other toxin may have an affinity for a certain organ, tissue, or part, and produce irritation in the capillaries in a distinct part of the body, or the capillaries through the entire body may become involved. . . . In many of these conditions, however, before the tissue already irritated becomes involved, the nervous system has become affected. The nervous system may already have become affected from other causes. Thus locomotor ataxia, traumatic injuries to the spine, paretic dementia, cerebral paralysis, neuroticism and degeneracy, and last, but not least, stomach neurasthenia. The poison in the blood, together with the diseased peripheral nerves, produces irritation and inflammation of the inner coats of the capillaries. . . . When irritation of the inner coats of the capillaries takes place, proliferation of the endothelium occurs. This inflammatory growth tends to obstruct the lumen of the vessel. . . . The capillaries become obstructed, and finally obliterated. This finally impedes the circulation.

"Owing to obliteration of the arterioles in the alveolar process, stasis of blood must follow. The detritus from the alveolar process, therefore, must remain in the tissue and collect upon the roots of the teeth.

"Among the predisposing influences which cause this disease are syphilis, tuberculosis, mercurialism, plumbism, brass poisoning, lithemia, nephritis, gout, rheumatism, alcoholism, scurvy, nervous diseases, pregnancy, and old age. Under certain conditions of the system any and all diseases which tend to lower the vitality, producing anemia, will assist in producing this disease." (Talbot, "Interstitial Gingivitis.")

It will be noted that largely these diseases are chronic, lasting many years; that endarteritis as a sequela must be equally chronic; such arteritis would necessarily be preceded by a disturbance of nutrition of the peridental glands. These glands, in an effort to free the system from toxins or burdened with calcic waste from the circulation or alveolus, would pass it down via their ducts to the gingival gland, where it might either set up inflammation in passing or form concretions upon the tooth cervix.

Later, from the greater capillary irritation and slowing of the blood-current, the glands would degenerate and become necrotic. The excessive detritus remaining in the tissues from blood-stasis, we submit (following etiology of mercurialism), is deposited *not in the fibrous peridental membrane as such, but in the glandular tissue direct* lying in this membrane. The calcic nidus thus formed close to the tooth-root, from successive concretions, finally becomes attached. In support of this theory we would cite the following well-established facts:

(*a*) D. D. Smith has established the liability of these glands to pyogenic infection, and resultant peridental abscess.

(*b*) Ebstein has proven in gout that the uratic deposits occur in distinct foci of necrotic tissue, supposedly glandular.

(*c*) Deposits in pyorrhea simplex correspond to the position of the gingival gland, and occur in the gingival space, into which space these glands empty their secretion.

(*d*) Deposits in pyorrhea complex usually exist in minute but gradually increasing areas, which project into the peridental tissues and correspond exactly in location to the peridental glands. (See diagram, DENTAL COSMOS, February, 1899, page 110.)

(*e*) Except in the last stage,—that of exfoliation, and rarely then,—the deposits are multiple and isolated, as from some glandular element, rather than a membrane or tissue surface.

The arthritic diseases, gout, rheumatism, and allied conditions, as lithemia and uric acid diathesis, no doubt play a prominent part in the production of pyorrhea complex. That lithemia is an ever-increasing factor in producing this lesion there is little room to doubt, but that the deposit of urates is direct, as in true gout, except in rare cases, we cannot admit.

If the etiology of pyorrhea complex is to be determined by the presence of urates in the serumal calculi, as the urates appear in the tophi of gout,—apparently the method in vogue,—the verdict is established *a priori* that uricacidemia is but a small factor in the production of pyorrhea.

While many analyses of serumal calculi made by Peirce, Brubaker, and others show a decided predominance of urates, in the vast majority only traces are found.

Carpenter and Salisbury examined for Dr. Talbot the serumal calculus from nine hundred and fifty cases, and only from five to six per cent. gave positive evidence of uric acid by chemic and microscopic examination. (See Talbot's "Interstitial Gingivitis.")

These analyses are in formulæ similar to calcic detritus generally, —*i.e.*, water and organic matter about one-third, calcium phosphate two-thirds, with a small percentage of calcium carbonate and magnesium phosphate.

Many such careful investigations prove conclusively the idea of the writer, that in a majority of the cases of uricacidemia and lithemia pyorrhea complex is produced by toxic action on the cerebral and spinal centers, affecting the capillary and glandular elements of the peridental membrane, or, in other words, endarteritis. That these glands *may* at first deposit a percentage of urates in the gingival space and their own tissue is true, just as they deposit any other irritant to their tissue. But *largely* endarteritis obliterans follows, with the calcic detritus from the wasting alveolar walls depositing in the glandular tissue and forming one of the many calcic elements which become attached to the tooth. Thus it is that there frequently appears a small percentage of urates in serumal calculi. (Talbot asserts this idea, developing it forcibly, but omitting this important rôle of the peridental glands.) This whole series of phenomena is due to uric acid acting reflexly,—*i.e.*, a typical reflex neurosis.

Uric acid as the source of reflex nervous disturbance is well recognized. Such authorities as Haig, Mays, Conklin, A. Reaves Jackson, N. S. Davis, and Broadbent associate uricacidemia with neuroses such as neuralgia, sick headache, irritability of temper, hyperesthesia, intense itching and pain in the skin, impaired memory, vaso-motor disturbance, melancholia, delirium, epilepsy, and coma. Bishop and Tyrrel have established the direct relation of rose cold, hay fever, and asthma to uricacidemia. (Bishop, "Diseases of Ear, Nose, and Throat.")

Endarteritis obliterans of the alveolar capillaries being concomitant with the reflex neuroses, and these neuroses predominating as a sign of uricacidemia, we should expect the deposits in this diathesis to be produced precisely as those from any acute or chronic disease acting reflexly, and be due to the neuroses dependent on the uric acid in the blood, rather than the uric acid as such. That such is the fact the analyses quoted prove, nevertheless there may occur acute cases where the deposits are purely uratic salts, as in gout. In fact, it is the writer's opinion, had the coarse hematogenic deposits in the case reported been analyzed they would have shown a primary nidus of pure urates, with added concretions of the phosphates of lime, etc., from the deteriorating alveolar walls.

It would thus follow in uricacidemia that, while the *few* suffer from the direct action of uric acid on the peridental glands, the *many* suffer from the attendant neuroses it establishes; both states constituting pyorrhea complex. These facts should harmonize many of the opposing theories extant, and assist to further investigations.

But what of that large percentage of pyorrhea complex occurring in apparently perfect health?

Perfect health is rare indeed; nevertheless there are many true pyorrheas in constitutions without an appreciable defect. Many of these cases are due no doubt to slight reflex disturbances, as stomach neurasthenia, etc., which we believe are also largely the systemic factor in producing a predisposition to caries.

Talbot has shown the entire alveolar process and denture to be a transitory structure. The temporary teeth call the alveolus into being; it is again changed trophically to accommodate the permanent teeth, and when they are lost the alveolus and peridental membranes disappear, having accomplished their function. The teeth and alveolus are said to be degenerating from lack of use, soft foods, etc. Nature is warned that the parts are no longer needed, and, following the laws of evolution, she proceeds to accomplish their loss. This, as a normal process, is associated with osteomalacia. Osteomalacia is concurrent with senility. Senility may occur at any time after puberty. (Talbot's "Interstitial Gingivitis.") A general gingival recession, without inflammation or deposit, and the apparent elongation of the teeth and shrinking back of the gingivæ and process, are characteristic. These changes are accomplished with so little irritation as to appear almost natural, and occur so frequently as to be quite common.

In osteomalacia the calcic detritus is carried to the general system through a healthy circulation, consequently without deposits in the peridental glands and on the teeth. On the slightest continued vaso-motor disturbance, resulting in capillary stasis, the calcic detritus burdens the tissues, is deposited by and in the peridental glands, and pyorrhea complex, without apparent systemic defect, is complete. A single tooth having lost its occlusion is a type. In perfect health there occurs recession and elongation; later, and in perfect health again, a defective circulation will produce pyorrhea.

With these views of pyorrhea in mind, the pathology of the case reported is evident.

The family history, which is markedly arthritic,—*i.e.*, vague rheumatic pains, typical uric acid headache, and, most notable of all, a chronic rheumatic pharyngitis,—constitutes a predisposition to hematogenic calcic deposits, dependent on the uric acid diathesis. "The causes that determine the manner in which irritation produced by excessive uric acid may express itself are three,—viz, central, peripheral, and hereditary." (*Vide* Bishop.)

Haig says, "The structure of the nerve-centers and the disturbance of its vessels not only determine the kind of disturbance which uricacidemia will produce in any given case, but also explain why one person suffers in this way from functional nervous diseases while another, with about as much uric acid in his blood and body, escapes. When the nervous system is depressed by fatigue, deficient food, etc., a smaller amount of uric acid in the blood will suffice to produce disturbance of function than at other times." (Haig, "Uric Acid in the Causation of Disease.") "The poison in the blood, together with the diseased peripheral nerves, *may** produce irritation and inflammation of the inner coats of the capillaries." (Talbot, *vide.*)

The arthritic conditions may have been aggravated by the preceding attack of typhoid malaria.

L. C. Graff says, "Influenza, ague, and other forms of fevers store up uric acid in the body." Peiper says that alkalescence of the blood diminishes in all fevers.

Uric acid excess is produced in one of two ways. In the first by defective metabolism affecting the disintegration of albuminous substance, and producing a partially oxidized product, uric acid instead of urea, a direct overproduction is established. In the second the ratio of uric acid in the blood is normal (1-33), but it is rapidly accumulated above that ratio by diseased or inactive kidneys, so the blood-stream may be laden with quadriurates and only a slight excess show in the urine.

Such nephritic conditions are quite common, and the resultant retention of uric acid in the blood proves urinary analyses of very little diagnostic value; dependence only is to be placed in examination of the blood direct. The result of the analyses in this case—uric acid very slightly in excess—would indicate inactive kidneys following typhoid fever, and explain so many general symptoms of uric acid excess in the body with little if any excess in the urine.

So to a rheumatic diathesis is added an excess of uric acid, circulating as quadriurates in the blood, which in turn produces an acute attack of rheumatic pharyngitis. This attack is accompanied by much pain, like other acute rheumatic attacks, and responds readily to the exhibition of salicylates.

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*Italics mine.

Chronic and acute rheumatic pharyngitis have been by Bishop declared distinct reflex neuroses, associated with uricacidemia.

The etiology would appear as follows: The excessive uric acid, reaching the cerebral centers, would reflexly produce an acute attack of rheumatic pharyngitis, with an acute obliterating endarteritis. This endarteritis produces its usual effect on the capillaries and alveolus.

The peridental glands already depositing urates become necrotic from the obliteration of the surrounding capillaries, and form the numerous foci for the deposition of the calcic detritus from the wasting alveolus; this accumulates rapidly, and concretions form on the roots. The palatal alveolar process is absorbed in the areas opposite the roots from the endarteritis obliterans, and the increasing inflammation produced by the deposits. The flood of uric acid into the circulation was finally prevented by some agent which produced alkalinity of the blood-stream, and the urates were stored in the body tissues and the trouble ceased.

We would thus pronounce this case one of acute hematogenic pericementitis, associated with acute rhemuatic pharyngitis dependent on an arthritic diathesis aggravated by uric acid excess.

CERAMIC ART IN THE RESTORATION OF HUMAN TEETH.

BY J. LEON WILLIAMS, D.D.S., L.D.S., LONDON, ENGLAND.

(Continued from vol. xli, page 1093.)

PORCELAIN, PORCELAIN AND GOLD CROWNS ON NATURAL ROOTS.

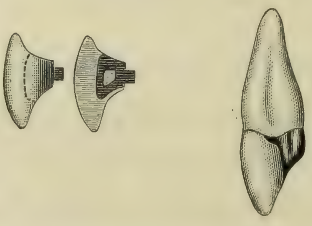
A JUDGMENT cultivated by experience can alone determine the extent to which a decayed or broken natural tooth may be successfully restored by the methods of porcelain inlay already described. Exceptional skill may succeed to any extent, but there is a practical limit beyond which all efforts must be considered as brilliant experiments. In most cases I doubt if it is advisable to attempt the restoration of more than one-third of a tooth by porcelain inlay, and to this extent only when the pulp is alive and in a healthy condition. When the pulp is dead and one-third or more of the crown gone, I would, except in rare instances, amputate the broken or decayed natural crown and restore with a complete porcelain crown. Such an operation would probably prove more durable and altogether satisfactory than an inlay.

During the past ten or twelve years there has been, with almost every appearance of the monthly dental journals, some announcement of a new method of crowning natural roots or some modification of an old method. I have experimented with nearly all of these methods which contained any element of novelty, and I have reached the conclusion that the modification of the Richmond crown known as the "collar" crown, for the six anterior teeth, and a modification of the Bonwill crown for bicuspids and molars, contain all that is best in the methods for restoring broken and decayed natural teeth.

For crowning the six upper front teeth there is no safe plan which does not involve a collar or ring passing behind the pin. The strain on these teeth is always from behind forward, and the ring may therefore be ground away at the front and the porcelain face fitted just under the free margin of the gum. Where the natural teeth can be perfectly matched there is no possibility of detecting the artificial character of this work. The method is perfect so far as the metal work is concerned, and the only feature open to criticism is the porcelain fronts supplied by the manufacturer.

Every dentist who is striving to reach the highest artistic results in his work is painfully aware that in many instances it is not possible to perfectly match the natural teeth. The English teeth have the advantage of a texture which permits grinding into proper shape, but in point of coloring and shading they are far inferior to the American teeth. Neither the English nor American pin teeth are strong enough for crown- and bridge-work. We are to-day in great need of a good variety of *strong* teeth of natural shapes and colors for the particular work under consideration. Probably any of the leading manufacturers would take this matter up if there were a strong demand made upon them. But until that bureau which I am always advocating is formed within the national associations, under the management of which all such matters as this would come, there will, I fear, be no organized demand made for what is so greatly needed. The majority of dentists are, unfortunately, evidently content with whatever the manufacturer places in their hands, and, as the majority of patients have even less knowledge and taste than the most mediocre dentist, the present condition of dental art is not easily improved.

FIG. 12.



A new tooth (the invention of Dr. J. S. Campbell) has recently been introduced by the Dentinax Tooth Company, of London and Chicago. From tests which I have made I find that this tooth greatly exceeds in strength the ordinary pin tooth. The gradation of color in such as I have seen is also good, and the modeling is fine in a few of the molds. They are, however, difficult teeth to mount, and their range of use, owing to their thickness (see Fig. 12), is limited. As will be seen from the illustration, a triangular piece of platinum is inserted in the body of the tooth with a hole cut in the center, through which the porcelain unites. It is evident that a tooth which has an attachment running two-thirds its length must be much stronger than one which is held by the points of two pins. Moreover, the insertion of the pins, especially in cross-pin teeth, greatly weakens the porcelain. The proof of this is found in the fact that the porcelains, when they break, are nearly always found to do so at the point where the pins are inserted. Now, when we consider that the lateral or side strain on a porcelain tooth is almost nil we have an important suggestion for the manner in which the fastenings of these teeth should be constructed. In Figs. 13 and 14 I show two devices for the construction of porcelain facings and their backings which give a tooth far stronger than the ordinary pin tooth, and at the same time one that may be very easily and quickly repaired when broken without weakening the backing.

FIG. 13.

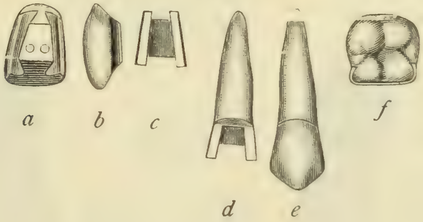


FIG. 14.

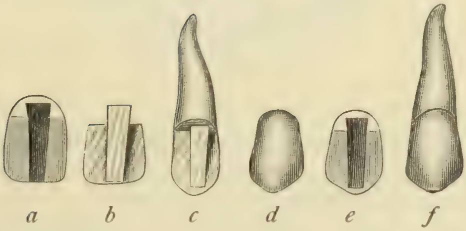


Fig. 13 is a modification of a method which I first devised some fifteen years ago, and which will be found illustrated in "The American System of Dentistry." In this device the sides of the porcelain front are grooved, and the tooth is grasped its entire length by the backing. In Fig. 14 the porcelain is grooved its entire length in the center of the back. Into this dovetail groove the corresponding bar on the backing slides. It is my design to have the backings made by the manufacturer and baked on to the teeth. Duplicate sets of grooved teeth without backings are to be supplied for repair cases. In cases of breakage, which I believe would be very rare, the fragments of the broken porcelain are removed and the grooved duplicate porcelain cemented onto the dovetail bar with oxyphosphate cement. Ten minutes is ample time for making such a repair, and such a repair is much stronger than can be made with any pin tooth, as I have demonstrated by many tests.

The manufacturer could make these backings and supply them to the dentist much cheaper than he could make them for himself, to say nothing of the time saved. Two further important advantages of this method would be that no allowance or guessing need be made for change of color by backing and firing. The tooth is matched with its backing, baked in position, and there is no change in color in soldering. Furthermore, the backings being baked onto the porcelains, there are no spaces or interstices for holding fermenting or putrefying liquids. Here is a stronger and more easily worked tooth than has ever before been devised. Here is a tooth that can easily be made to give a more perfect result from every point of view than anything before offered the dental profession. It is open to any or all manufacturers to supply it. I wonder how soon we shall get it.

FIG. 15.

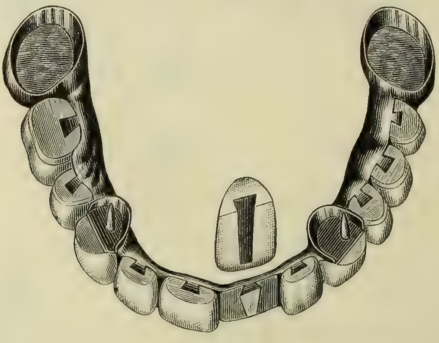


Fig. 15 shows a full upper set of bridge-work constructed of these teeth, with one of the central incisors removed and a duplicate grooved facing ready for cementing in place.

I have said that I regard the Bonwill crown as embodying the best general principles for restoring the bicuspids and molars. Fig. 16 represents my modifications of this crown for the bicuspids and first molars, beyond which I never attempt to place an all-porcelain crown.

Lack of natural character in the modeling is the first criticism which I have to pass upon all the porcelain crowns supplied by the manufacturers up to date. I have attempted to overcome this by supplying the manufacturer with models made by taking impressions of perfect sets of natural teeth. They have not yet succeeded in realizing my idea of what these teeth should be, and the drawings, especially those showing the first and second lower bicuspids (*a* and *b*, Fig. 16) do not do justice to the teeth as made. The first point, then, is to get teeth which more nearly conform to the shapes of the natural teeth. Take the bicuspids, for instance, which are now supplied. They are supposed to be equally well adapted for restoring upper and lower first and second bicuspids. This attempt to make one tooth take the place of four has resulted in the production of something which does not closely resemble any one of the four teeth it is designed to replace. The same objection applies to the molars. These teeth are all badly shaped, especially at the neck, where they are to be adapted to the natural root. What a long advance step it would be if some manufacturer would secure the assistance of some dentist who really knows what is wanted, and construct molds from even a dozen sets of models of bicuspids and molars made from natural teeth.

FIG. 16.

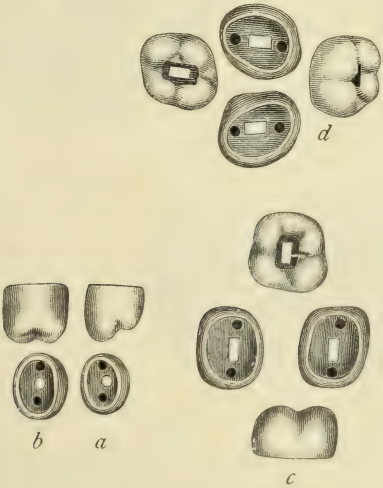
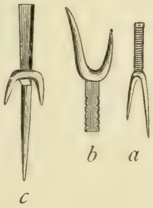


FIG. 17.



By referring to Fig. 16 it will be seen that in my models the round hole or holes in the molar teeth is replaced by an oblong hole with square corners, which in both upper and lower molars is placed in the center of the tooth. On either side of this hole small pits are cut into the substance of the crown, the purpose of which will appear a little later. I use four forms of pins for setting these teeth,—a screw-cut post, like the How post, for bicuspids which have but a single, well-defined pulp-canal, a forked pin for bicuspids with a divided canal and for lower molars, as shown in *a* and *b*, Fig. 17, and a fourth for upper molars, which has a long branch for the large canal of the palatine root of these teeth, with two short branches or prongs for the buccal roots.

Let us suppose we wish to set a lower molar. The canals are reamed out with my tri-concave reamers, and an antiseptic plug of gutta-percha placed in the end of each root. The roots are ground down level with the gum, and the pulp-chamber enlarged and beveled outward to the gum-margin. The deep portion of the cavity thus made is undercut with inverted cone or wheel burs. This stage is supposed to be represented in Fig. 18, but the cut does not show the proper shape of the cavity.

The divided post *b* is now cemented with oxyphosphate into the canals. No more oxyphosphate should be used than is necessary to just fill the canals. While this is hardening mix a quick-setting amalgam, and fill the cavity of the enlarged pulp-chamber right up to the gum-margin, as shown in Fig. 19. Now make another mix of amalgam and fill the depression and the little pits on the under side of the crown, and press it to place. Just the right amount of amalgam must be used to make a perfect joint with the filling in the pulp-chamber without raising the tooth, which has previously been accurately fitted. If the position is just right, force the tooth well home, and do not move it again, but quickly fill the undercut cavity around the square post with amalgam. The square post and the little pits filled with amalgam will prevent loosening of the tooth from rotation, which sometimes occurs with the ordinary crown.

FIG. 18.

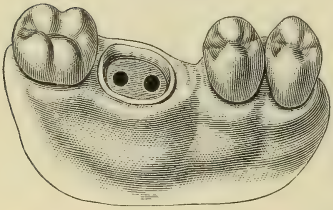


FIG. 19.

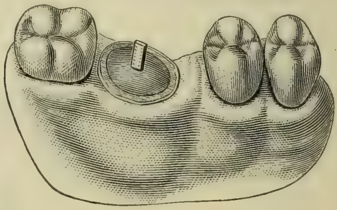


FIG. 20.

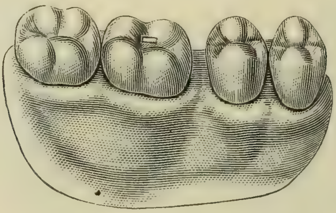


Fig. 20 shows the completed operation, and is the best method for restoring single bicuspids and molars that I have ever discovered. In fact, the methods of setting incisor, bicuspid, and molar crowns just described represent the results of nearly twenty years' experiment and selection in this phase of prosthetic dentistry.

(To be continued.)

A PLEA FOR THE LIBERAL CONSIDERATION OF CATAPHORESIS.

BY PAUL VOIGT, D.D.S., PHILADELPHIA, PA.

DR. BOGUE'S article on "The Unnecessary Extraction of the Dental Pulp through Cataphoresis," published in the May number of the DENTAL COSMOS, contains such sweeping *inferences* against the use of cataphoresis that the writer desires to enter a plea for the more liberal consideration of a treatment which, during the few years it has been in use, has done so much to make operations on sensitive teeth more bearable, and contributed its share in minimizing the dread of the dental chair.

When, some years ago, the attention of the dental profession was called to the virtues of cataphoresis, and instruments were put on the market at a price within the reach of every practitioner, thousands were bought with the idea that with very little knowledge, trouble, and time all cavities in the future could be prepared, and pulps extirpated painlessly; but when dentists found that it required some little time and a great deal of patience, and the average patient objected to paying for the extra work, many practitioners condemned the treatment and discarded the instruments entirely.

There is nothing new in this procedure, and cataphoresis has but followed the path of almost all the medical and dental discoveries of the past. Crowds rush to buy and use new remedies, but seldom does the discovery come up to their expectation. The fault lies principally in the man, who, instead of accepting everything, should examine slowly, carefully, and conscientiously into all the claims and merits of new discoveries, and then draw his own deductions. He will then find, in most cases, that the discoverer, in his enthusiasm, has overestimated the curative powers of his remedy and the uses of his instrument.

Cataphoresis has earned a place in every scientific dental office. It may lose some of its value in applying it back of the cuspids, yet even there it has its worth; but for anesthetizing the six anterior teeth the writer, who has been using cataphoric treatment for over three years, has found nothing to equal it. No other remedy will so effectually obtund extremely sensitive dentin, and with no other treatment can a pulp in a single-rooted tooth be removed with so much satisfaction and so little pain at one sitting.

After the patient is satisfied that there will be no electric shock, very little objection is made to the sensation produced by the current if the strength is not increased too rapidly; and if the interruptions which are ordinarily encountered in preparing sensitive cavities are taken into consideration, the writer doubts if there is much difference in the time occupied with cataphoric treatment and without it.

The two principal uses of cataphoresis are the obtunding of highly sensitive dentin and pulp-extirpation in the anterior teeth, but, aside from these, it can be successfully used in cutting down sensitive teeth for the preparation of crowns; when it is necessary to devitalize a tooth for a young patient where arsenic is contraindicated; in teeth with no cavities, but where abrasion of the enamel has taken place to such an extent that it is deemed necessary to destroy the pulp, and in facial neuralgia, where the current is to be used without the cocain solution.

Cataphoric treatment, or any other treatment for sensitive dentin, would hardly be indicated in cases where the teeth are not above the average degree of sensitiveness. It should be looked upon as a remedy to be used only when the proper case presents itself; but when the operator gets such a case, and the patient tells him that formerly all her or his teeth had been filled with tears running down their cheeks, and several appointments had to be made before a filling could be inserted, then will the true merit of cataphoresis show itself, and the patient will surely say, if the treatment has been used intelligently, that never before has he had a tooth filled with so little pain.

REPORT ON TEST CASES OF PULP-AMPUTATION, MUMMIFICATION, ETC.

BY THEODORE SÖDERBERG, SYDNEY, AUSTRALIA.

JUDGING from a paper read before the Central District Dental Society by Dr. O. E. Houghton, and from the discussion which followed (*Items of Interest,* December, 1899), it appears that professional opinion in the United States is on the point of turning, if it has not already turned, in favor of pulp-amputation with subsequent antiseptic mummification of dead pulp-remnants in all such cases where total pulp-extirpation is judged a mechanical improbability. "The practical test of experience and time alone can determine the value and utility of this class of operations, as of all others." (Editorial in DENTAL COSMOS, May, 1899.)

Since 1894, out of a total number of about nine hundred cases of pulp-amputation treated by me with the mummification paste, as published in the DENTAL COSMOS, November, 1895, not a single case of pericementitis or alveolar abscess traceable to the method *per se* has come under my personal observation.

Now, a bare statement like this does not, of course, prove much. The first question is, From an empirical point of view, how many of these nine hundred cases can strictly be termed test cases?

In compiling the subjoined report for the DENTAL COSMOS, I have deemed the following requirements obligatory before entering a case as a test case: (1) Certainty of correct diagnosis; (2) cavity, tooth-structure, etc., to promise at least five years' durability of filling; (3) certainty of enlargement of chamber to hold sufficient paste; (4) proper sterilization with peroxid of hydrogen and concentrated carbolic acid prior to introduction of paste, and exclusion of saliva during insertion of filling; (5) examination of tooth not less than two years after treatment.

Eliminating all cases not in conformity with the above requirements, there remain the following two hundred and twenty test cases:

Tooth.	Time of Treatment.	Last Examined.	Remarks.
	1894.		
6.7.7	Jan.	August, 1899.	Mercurial paste, Witzel's formula. All more or less discolored.
7.7	"	July, 1899.	
6	"	July, 1897.	
6	Feb.	Nov., 1899.	
6.6	"	March, 1897.	
6	"	Feb., 1897.	
7	March.	March, 1900.	
4	"	July, 1899.	
6.7	"	April, 1900.	
6	April.	Oct., 1896.	
6	"	April, 1896.	
5	May.	July, 1899.	
8	June.	Jan., 1897.	
6	"	Dec., 1899.	
6	"	Oct., 1898.	Secondary decay. Canals putrid.
6	"	June, 1897.	
7	"	April, 1897.	Filling leaky. Cement and paste intact. Pulp-remnants dry and powdery. No odor.
4	"	Feb., 1897.	
6.6	July.	Sept., 1899.	
6	"	July, 1899.	
5.6	"	Nov., 1899.	
7	Aug.	Nov., 1899.	
6	"	May, 1899.	
5	Sept.	Sept., 1899.	
6	"	April, 1897.	
6	"	Feb., 1898.	
7	"	Sept., 1898.	
6	Oct.	Dec., 1898.	
7	"	April, 1899.	
6	Nov.	April, 1897.	
6	"	Dec., 1898.	
	1895.		
7	Jan.	Feb., 1897.	
6	"	Aug., 1897.	Failure and loss of filling. Alveolar abscess.
8	"	March, 1899.	
3	"	Jan., 1898.	
4.7	"	Feb., 1898.	
6	"	Feb., 1900.	
4.5	"	Feb., 1898.	
6	"	Jan., 1900.	
4.6	"	Dec., 1898.	
4	"	April, 1900.	
8	Feb.	May, 1898.	
6	"	Feb., 1900.	
8	"	March, 1900.	
6	"	Feb., 1898.	
8	March.	Nov., 1899.	Extracted. Pulp-remnants microscopically examined. Found mummified. No odor of thymol.
6	"	Aug., 1898.	
7	"	Nov., 1898.	
6	"	April, 1899.	
6	"	Oct., 1898.	
7	"	July, 1898.	
7	"	April, 1899.	
6	"	Jan., 1900.	
8	"	June, 1899.	
6	April.	Oct., 1897.	
3.6	"	March, 1900.	
6	"	July, 1899.	
7	May.	March, 1898.	
	1895.		
2	May.	Nov., 1899.	Canal entered. Pulp-remnants mummified. Faint odor of thymol.
6	"	Feb., 1900.	
4.5.7	"	March, 1900.	
6	"	April, 1899.	
1	"	Jan., 1900.	Corner broken. Filling in situ. Crowned. Pulp-remnants alive.
6	June.	Dec., 1898.	
6	"	March, 1900.	
5	"	Jan., 1900.	
6	"	Feb., 1900.	
6	"	July, 1897.	Failure and loss of filling. Canals putrid. Acute pericementitis.
4.6	July.	March, 1900.	
6.7.7	"	Feb., 1900.	
1	"	Jan., 1900.	Canal entered. Pulp alive.
1.6	"	Oct., 1898.	
5	"	Jan., 1900.	
4	Aug.	April, 1899.	
6.6	"	Nov., 1898.	
5.6.7	"	Dec., 1899.	
3	"	May, 1898.	
6	Sept.	March, 1898.	
3	"	May, 1898.	
7	Oct.	Aug., 1899.	
5 6	"	Jan., 1900.	
7.7	Dec.	March, 1899.	
6	"	March, 1898.	
7	"	Jan., 1900.	
	1896.		
4	Jan.	Dec., 1898.	
5	"	May, 1898.	
6	"	Sept., 1898.	
6	"	Oct., 1898.	
8	"	March, 1899.	
7	Feb.	May, 1898.	
6.6	"	Sept., 1899.	
6	March.	May, 1899.	
5	"	March, 1900.	
5.5.	"	March, 1900.	
6	"	July, 1899.	
8	April.	Jan., 1899.	
5	"	Dec., 1898.	
5	"	Oct., 1898.	
6	"	Jan., 1900.	
6	"	Feb., 1900.	
4.5	May.	May, 1898.	
8	"	April, 1899.	
5	"	Jan., 1899.	
4	"	Feb., 1900.	
5.6	"	March, 1900.	
4	June.	March, 1900.	
7	"	Oct., 1899.	
6	July.	Dec., 1898.	
6	"	April, 1900.	
3	"	Jan., 1899.	Canal entered. Remnants mummified. Faint odor of thymol.
6 6	"	Aug., 1898.	
7.8	"	Feb., 1900.	
6	"	Sept., 1899.	
6.6.7	"	April, 1900.	

Tooth.	Time of Treatment.	Last Examined.	Remarks.
	1896.		
4·5	July.	July, 1898.	Both lower bicuspids tender on percussion. Very unclean mouth. Tartar. Gingivitis.
3.6	"	Nov., 1899.	
1	Aug.	Dec., 1898.	
6	"	Aug., 1899.	
6	"	Feb., 1899.	
6	"	Sept., 1898.	
6	"	April, 1900.	
8	"	April, 1899.	
7	"	March, 1900.	
5	"	April, 1900.	
1	"	April, 1900.	Canal entered. Some mummified shreds. Vitality near foramen doubtful. Faint odor of thymol.
5	Sept.	Dec., 1898.	
6	"	April, 1900.	
4	"	March, 1899.	
6	"	Nov., 1898.	
6	"	Sept., 1898.	
2	"	Jan., 1900.	Canal entered. Apparently empty. No odor of thymol.
8	Oct.	Nov., 1898.	
7	"	Dec., 1898.	
5	"	July, 1899.	
4	"	May, 1899.	
6.6	Nov.	Feb., 1900.	
4	"	April, 1899.	
8	"	July, 1899.	
6	Dec.	Jan., 1899.	
6	"	Oct., 1899.	
6	"	Feb., 1900.	
5·6	"	Jan., 1900.	
4	"	Oct., 1899.	
	1896.		
3	Dec.	March, 1900.	Canal entered. Shreds microscopically examined. Mummified.
6	"	April, 1899.	
	1897.		
4·5.6.7	Jan.	Sept., 1899.	
6	"	Jan., 1900.	
4·7	"	July, 1899.	
4	Feb.	Jan., 1900.	
6.6.6.7	"	Nov., 1899.	
6	"	Nov., 1899.	
5	"	Feb., 1899.	
1.3	March.	Feb., 1900.	
8	"	Oct., 1899.	
6	April.	Feb., 1900.	
6	"	June, 1899.	
4	"	Feb., 1900.	
7	"	Aug., 1899.	
6	"	Jan., 1900.	
5	"	March, 1900.	
1.2	"	March, 1900.	Canal of central entered. Considerable vitality of pulp-stump. Odor of thymol.
8	May.	Dec., 1899.	
5	June.	April, 1900.	
2·5	July.	Dec., 1899.	
5	Aug.	Nov., 1899.	
6	Sept.	Nov., 1899.	
4	"	Feb., 1900.	
5	"	Feb., 1900.	
6.7	"	April, 1900.	
6	Oct.	Dec., 1899.	
4	Dec.	March, 1900.	
6	"	Feb., 1900.	
	1898.		
4	Jan.	April, 1900.	
4·5	Feb.	April, 1900.	

The above data show that ninety-three test cases were examined after intervals ranging from two to three years after treatment, sixty-six cases from three to four years, thirty-nine from four to five years, nineteen from five to six years, and three cases over six years after treatment. In none of these cases were pericemental or apical trouble traceable to the method. The unsightly discoloration which took place in all those cases where mercurial paste was used was not found in the other cases. That the pulp-remnants in some instances were found alive a few years after should not give rise to surprise when it is borne in mind that the inaugurator of this method, Professor Adolph Witzel, in his last work states that he has microscopically found pulp-stumps healed and alive eleven to thirteen years after amputation and antiseptic treatment.

So far, all statements, reports, and tests by the different writers on this subject—the present writer included—have been of an empirical nature. The final judgment on the process rests with science. I hope on a future occasion to place the result of some microscopical and bacteriological tests before the profession. For the present, the "practical test of experience and time," now furnished by many men in many lands, should go far toward establishing as sound teaching the rule that *the chemical treatment of living or dead pulp-remnants will, in those numerous cases where total pulp-extirpation is doubted, compare favorably with the purely mechanical treatment of such cases.* It would at least be imprudent any longer to dispute the probability that, of the two methods, the chemical is *comparatively* the surest, safest, and most humane.

TRANSLATION.

INSTRUCTION IN THE CARE OF THE TEETH AND MOUTH.*

BY C. RÖSE, M.D., MUNICH.

FUNCTION OF THE TEETH.

THERE are two valuable ancient proverbs (in German), the truth of whose sayings are unfortunately often not adequately appreciated. They run, "Tough bread makes the cheeks red," and "Well chewed is half digested." The nutrition depends not upon the quantity of food swallowed, but upon that digested.

Foods, especially the farinaceous, are only capable of proper digestion after thorough insalivation in the mouth. The secretion of an adequate quantity of saliva can only be brought about by proper mastication. If the food is too soft, no necessity for active mastication exists. The stimulus which the act of chewing exercises upon the secretory activity of the salivary glands falls away to a greater or less degree, consequently the glands secrete only a smaller quantity of inactive saliva. Even such weaker saliva fails to be thoroughly incorporated with the food where mastication is inactive. Stomach and intestines are unable to properly digest food thus inadequately insalivated. The undigested mass gives rise to abnormal fermentations, leading to disturbances in the functions of the intestines.

STRUCTURE OF THE TEETH.

Whoever wishes intelligently to take proper care of the teeth and mouth must obtain at least a superficial knowledge of the structure of those parts. The human teeth are constructed of four different tissues. The principal constituent is the firm dentin. It incloses a cavity, the pulp-chamber (nerve-canal); this canal is occupied during the life of the tooth by the soft connective-tissue fibers of the pulp. The pulp is traversed by numerous blood-vessels and nerves. By reason of its great sensitiveness, the pulp as a whole is popularly known as the "nerve."

Each root possesses at its apex a narrow opening. Blood-vessels and nerves from the periosteum of the jaw enter the pulp through this opening. Fig. 2 shows the branching of the fine vessels from the main stems within the lower jaw to reach the apical canals.

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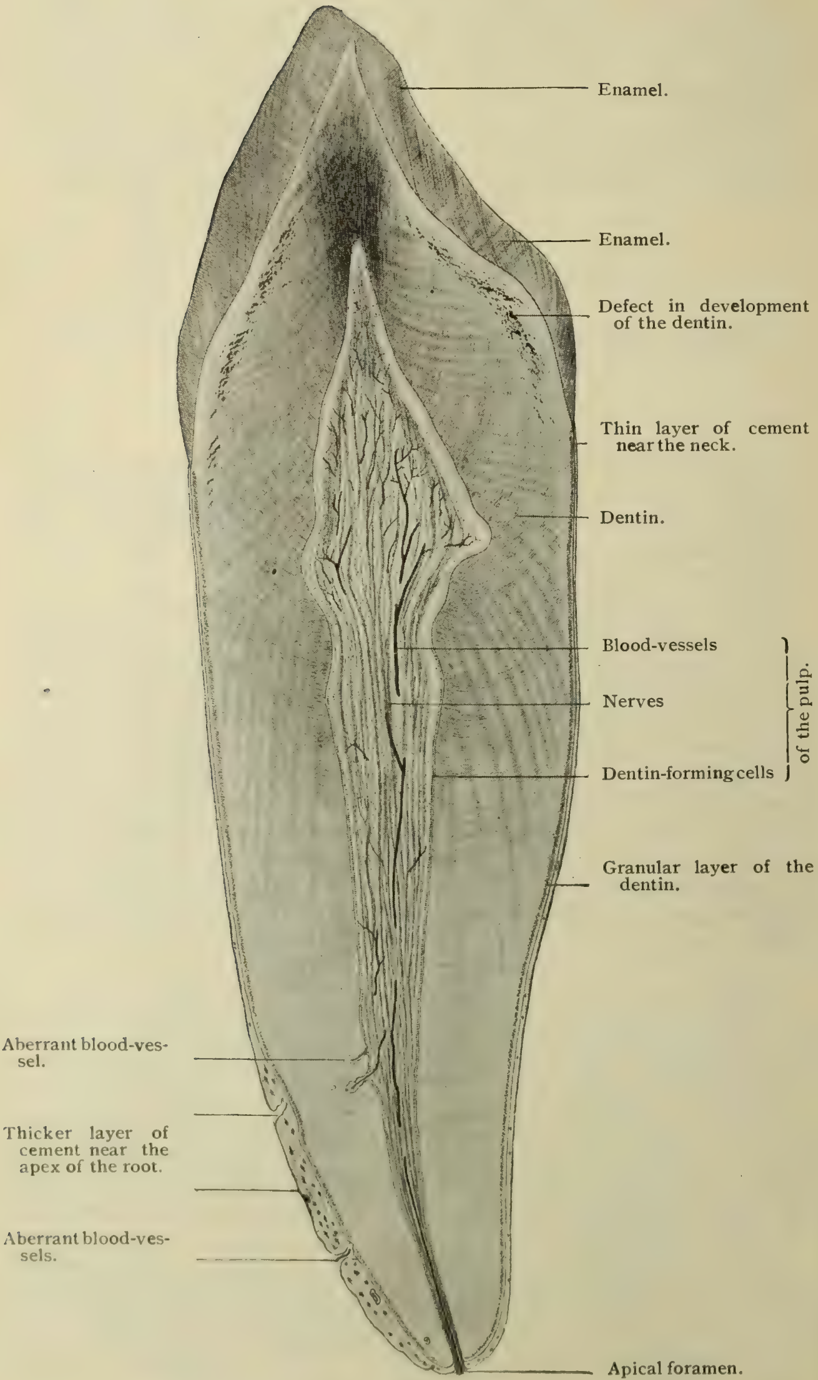
*Copyright, 1900, by C. Röse, M.D., Munich.

Fig. 1.

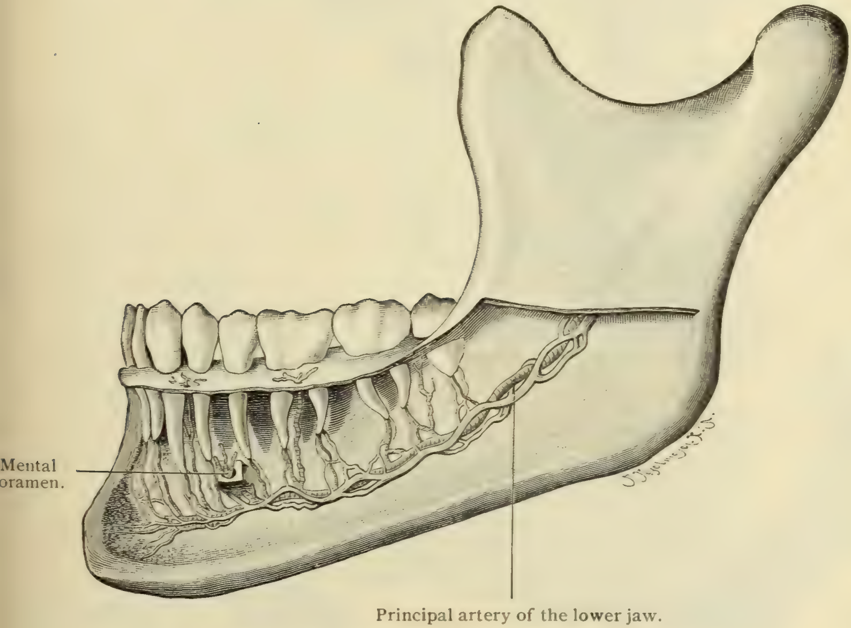

Enamel.
Enamel.
Defect in development of the dentin.
Thin layer of cement near the neck.
Dentin.
Blood-vessels
Nerves
Dentin-forming cells
of the pulp.
Granular layer of the dentin.
Aberrant blood-vessel.
Thicker layer of cement near the apex of the root.
Aberrant blood-vessels.
Apical foramen.

Longitudinal Section through a Human Canine Tooth. × 7.

The crown of the dentin is covered by the hardest tissue of the body, the enamel. The root is surrounded by a more or less thin layer of the bone-like "cementum." The enamel cap of the crown and the cement cap of the root (fang) join the "neck" of the tooth.

As regards the general shape of the teeth, the "milk" or temporary teeth are to be distinguished from the "permanent" teeth. The complete denture of the child consists of twenty teeth. In each of the four halves of the jaws are placed two temporary incisors, one temporary canine, and two temporary molars. The lower central incisors appear first, as a rule, at seven months; these are followed by the upper central, upper lateral, finally the lower lateral.

FIG. 2.

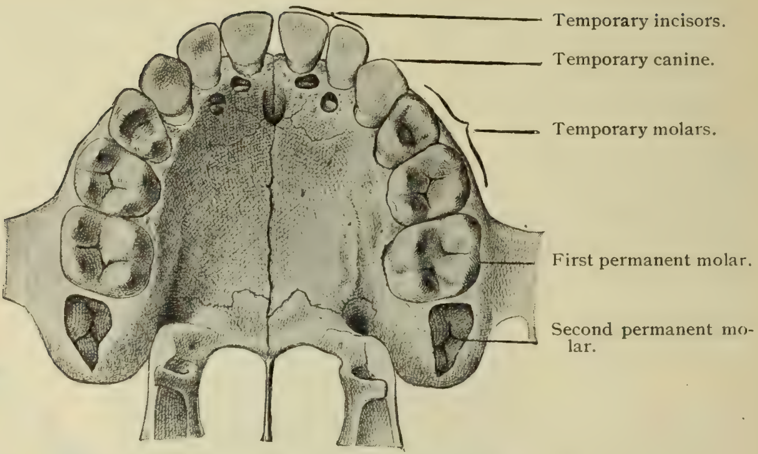


HUMAN LOWER JAW—OUTER BONY WALL REMOVED. Natural size.

At one to one and a half years the first temporary molars, shortly thereafter the temporary canine, make their appearance. The second temporary molars erupt at two to two and a half years.

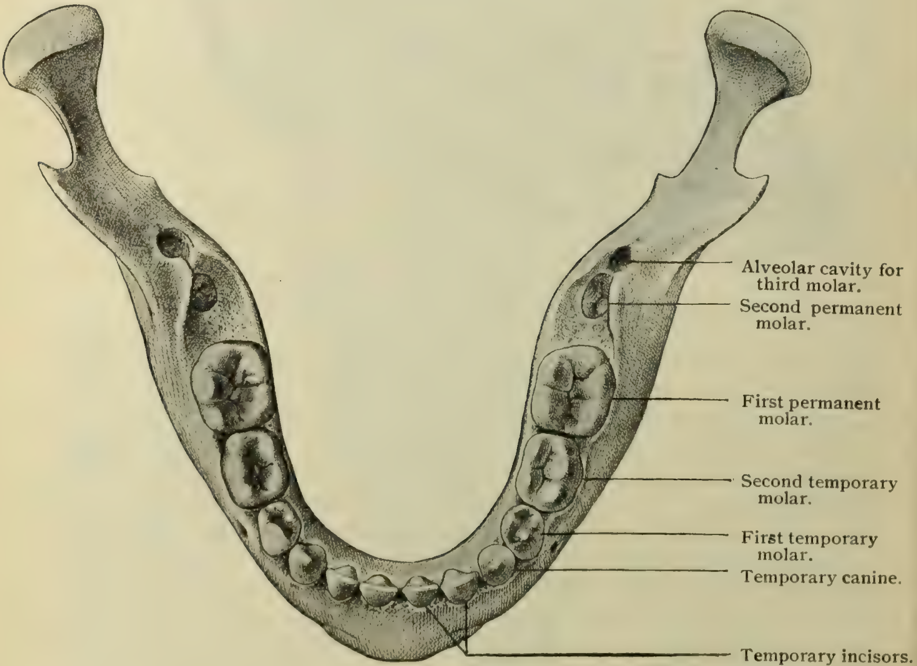
The thirty-two permanent teeth develop in the interior of the jaw-bone above, below, beside, and between the roots of the milk teeth (Fig. 5). In addition to the twenty teeth which replace the temporary set in the anterior parts of the jaws, the adult also possesses in the posterior divisions of the jaws three large molars upon each side. The latter had no representatives in the temporary set. *The first permanent molar* (Figs. 3 and 4) *is the largest and functionally most active, the corner-stone of the permanent denture.* It is the first of all the permanent teeth to erupt, in the seventh year. The remainder follow in order. *On account of its early eruption,*

FIG. 3.



UPPER JAW OF A CHILD AGED SIX AND ONE-HALF YEARS. Natural size.

FIG. 4.

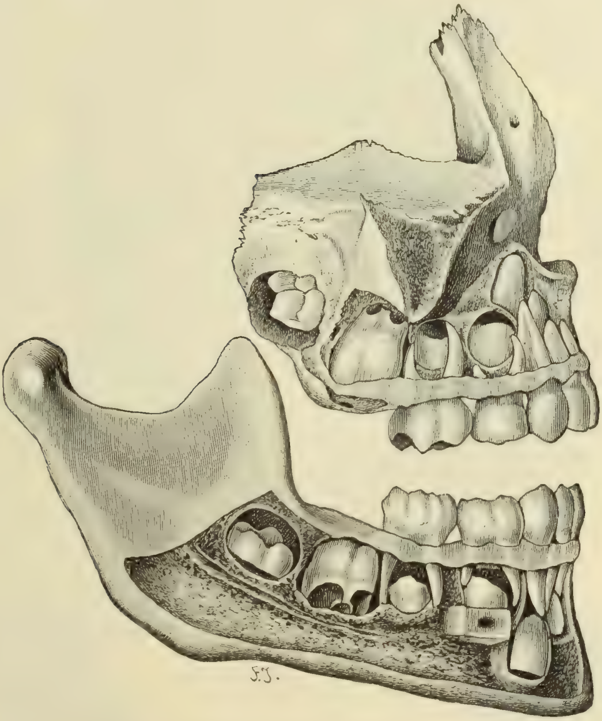


LOWER JAW OF A CHILD AGED SIX AND ONE-HALF YEARS. Natural size.

the first permanent molar is often, unfortunately, mistaken for a milk tooth. The astonished parents discover too late that they have permitted an important one of their children's teeth to fall into decay.

During the second dentition the first permanent molar has to perform the principal part in mastication. During this time it must be attended to as carefully as possible. In small-faced children, with narrow jaws, it is occasionally necessary to sacrifice some of the permanent teeth to make room for the remainder. It is customary to extract the first four permanent molars in the twelfth to thirteenth year, immediately before the eruption of the second molars. But should these teeth be still healthy, it is better to sacrifice the four small molars.

FIG. 5.



JAWS OF A CHILD AGED FIVE AND ONE-HALF YEARS.

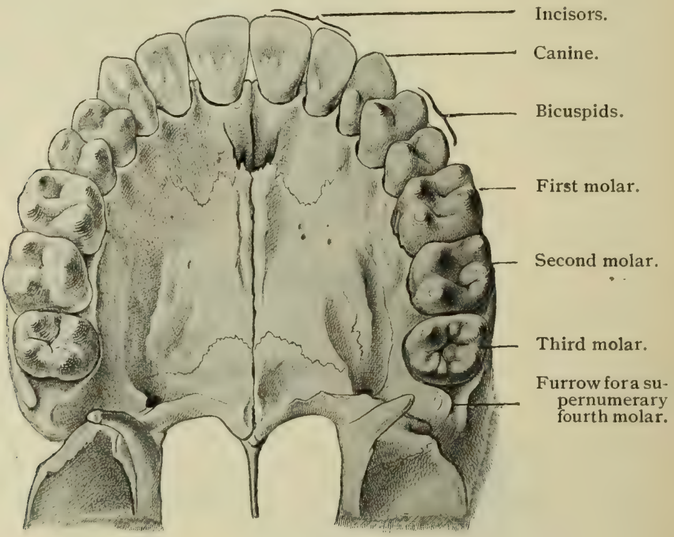
Outer walls removed to show the roots of the milk teeth and the immature permanent teeth within the jaw. Natural size.

The change from the twenty milk teeth to the corresponding permanent ones takes place between the seventh and twelfth years. The permanent teeth appear at the times indicated upon each tooth in Fig. 7.

The two rows of teeth of the upper and lower jaws articulate in such a way that each upper tooth meets its opponent upon two-thirds of the grinding-surface, while at the same time its remaining third is opposed to the corresponding portion of the tooth next back.

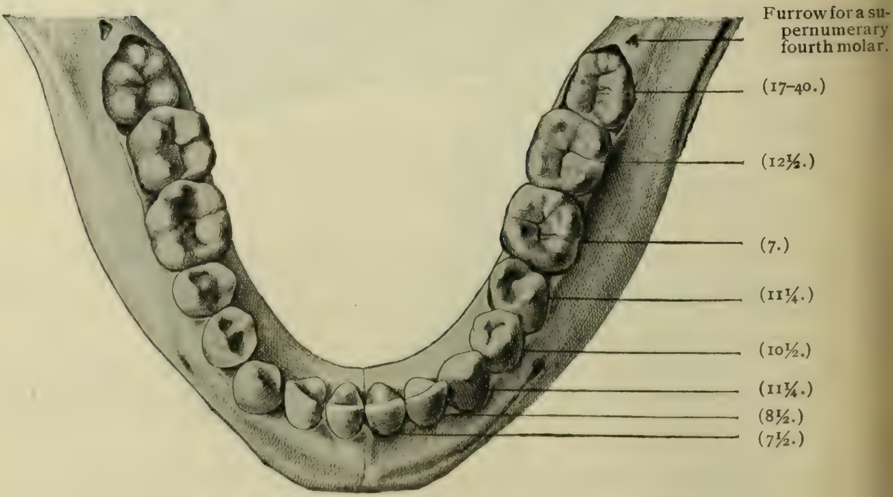
In proportion as the permanent teeth are preparing to erupt, the roots of the milk teeth become gradually absorbed. Finally the rootless crowns of the milk teeth fall out of themselves.

FIG. 6.



UPPER JAW OF ADULT Natural size.

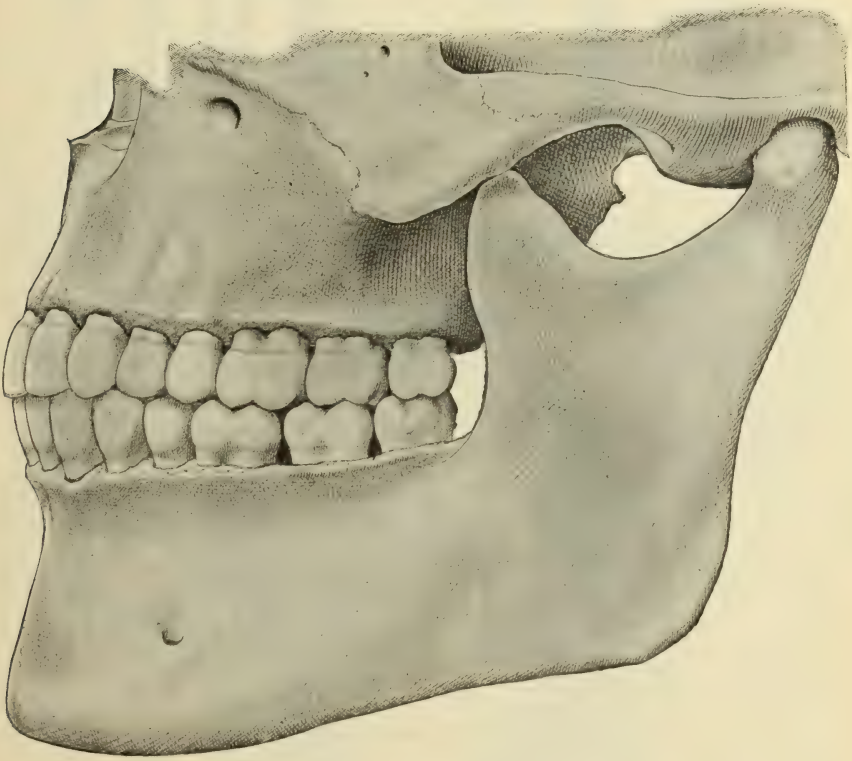
FIG. 7.



LOWER JAW OF ADULT. Natural size.

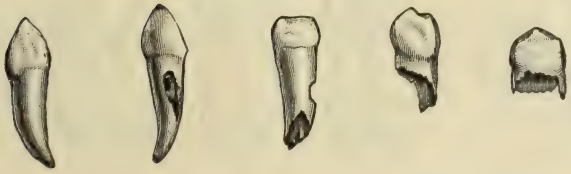
The second permanent molars erupt on an average at the age of eleven and a half years, behind the first permanent molars. The third molar, or wisdom-tooth, often fails, in the case of Europeans, to erupt. Its time of eruption varies between seventeen and forty years. A supernumerary fourth molar is occasionally found behind the wisdom-tooth.

FIG. 8.



JAWS OF ADULT WITH NORMAL ARTICULATION OF THE TEETH, LATERAL VIEW. Natural size.

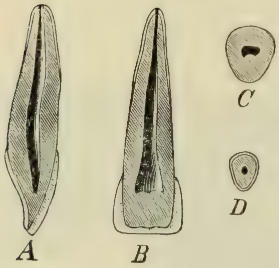
FIG. 9.



ROOT OF A LOWER TEMPORARY CANINE IN VARIOUS STAGES OF ABSORPTION. Natural size.

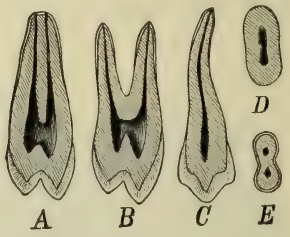
All the incisor and canine teeth have, as a rule, but a single cone-shaped root, and, corresponding to this, a simple spindle-shaped

Fig. 10.



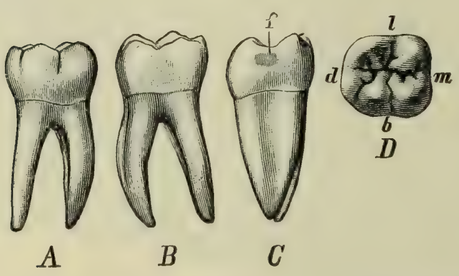
Central Upper Incisor. *A*, *B*, longitudinal sections; *C*, *D*, cross sections through the neck and lower third of the root. Natural size.

Fig. 11.



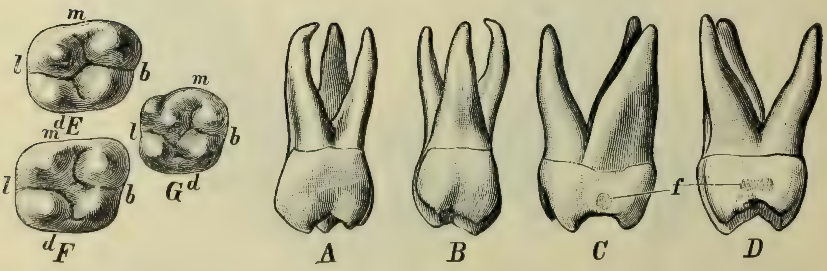
First Upper Bicuspid. *A*, *B*, *C*, longitudinal sections; *D*, cross section, showing form of pulp-chamber in the region of the neck; *E*, cross section through lower third of a root with two separate root-canals. Natural size.

Fig. 12.



First Permanent Lower Molar. Natural size.

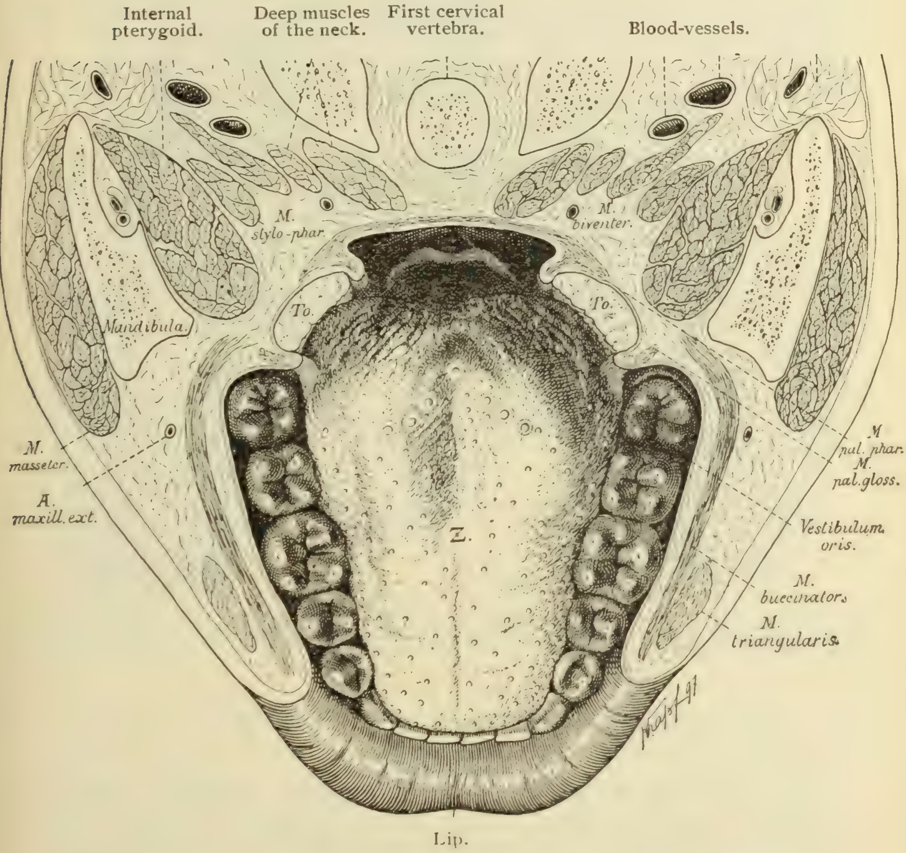
Fig. 13.



First Permanent Upper Molar. Natural size.

pulp-cavity. The permanent lower bicuspids have likewise only a single root; the upper ones, however, alternately possess sometimes one, sometimes two, rarely three, separate roots. Each root contains one or two capillary root-canals, continuations of the pulp-chamber of the crown and neck. All the lower molars have, as a rule, two; the upper, three roots. Molars with four, five, and six roots are rarer exceptions.

FIG. 14.

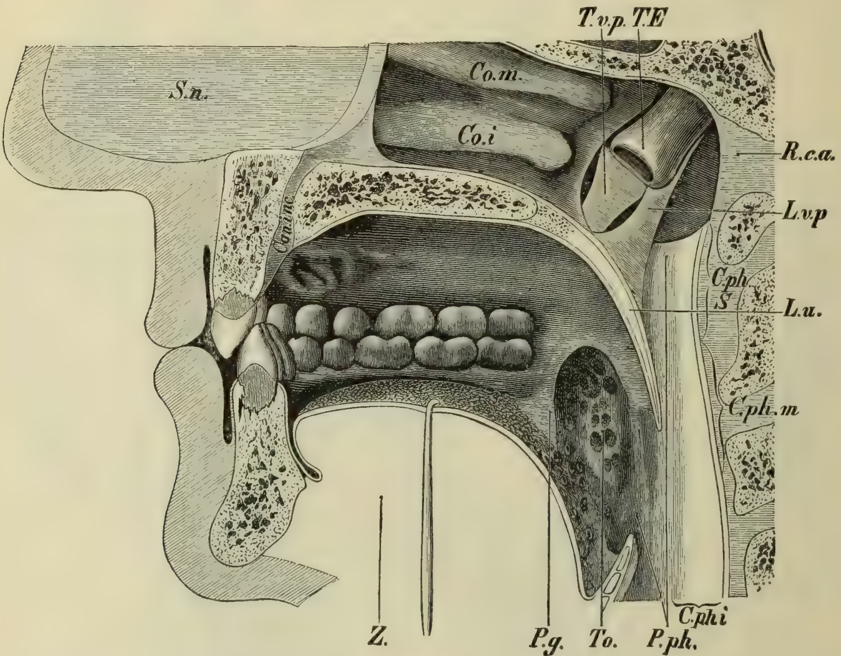


HORIZONTAL SECTION THROUGH THE HUMAN MOUTH. Natural size.

The teeth form the outer boundary of the true or inner mouth-cavity. The anterior surfaces of the crowns are covered by the lips and cheeks. The flat horseshoe-shaped space between the external aspects of the teeth and gums on the one hand, and the mucous membrane of the lip or cheek on the other (Fig. 14, vestibulum oris), is called the "cheek pouch" or "vestibule of the mouth." The cavity of the mouth is filled up completely by the tongue. In a state of rest, and with closed mouth, the teeth are inclosed airtight by the tongue on one side, the lips and cheeks on the other.

The ducts of the salivary glands open partly in the interior of the cavity of the mouth (sublingual region), partly in the cheek pouch (region of the second upper molar).

FIG. 15.



VERTICAL SECTION EXACTLY THROUGH THE CENTER OF THE ORAL CAVITY. The tongue, *Z*, removed from its natural position below the palate to show inner surface of the crowns of the teeth. Natural size.

DISEASES OF THE TEETH AND MOUTH.

Caries of the Teeth.

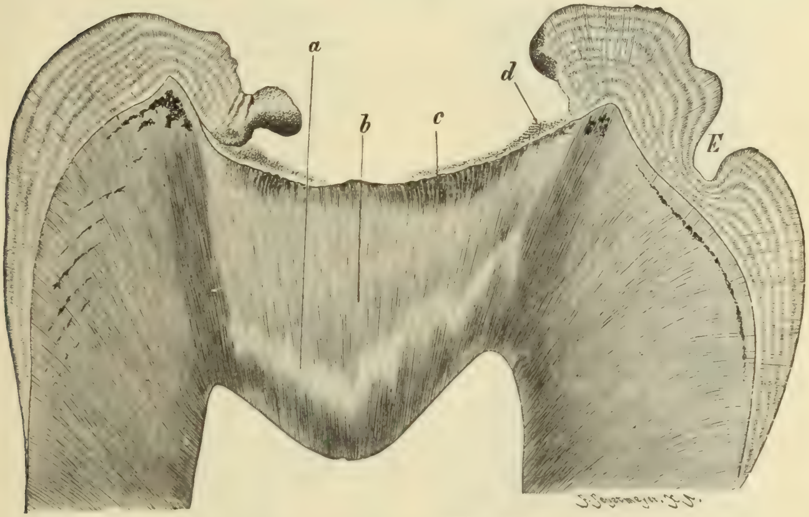
The most frequent and important disease of the human teeth is so-called "caries" (decay). This disease arises as follows: Bits of sweet and starchy food remain at certain inaccessible points, especially in the furrows of the grinding-surfaces, and in the spaces between the teeth. The starch is transformed into lactic and similar organic acids through the influence of fermentation fungi. These acids are naturally most active at the concealed points where they are formed. They remove the lime-salts of the enamel of the crown at circumscribed points. Bacteria of putrefaction then penetrate the decalcified tissue and destroy it completely. Thence a small cavity arises in the tooth. Bits of food lodge in the cavity. The latter remains constantly acid. The cap of cement is soon destroyed, and the caries is enabled to extend more rapidly in all directions in the softer dentin.

The door of entrance in the enamel to the diseased cavity is often quite small, while the disease may be quite extensive in the interior of the dentin.

Fig. 16 shows only a shallow opening. The entire club-shaped portion from *b* to the light area *a* is diseased. Inference: *Foci of caries apparently insignificant are to be treated as early as possible.*

When the caries has reached the neighborhood of the pulp, the much dreaded toothache begins. At first a mild drawing feeling of temporary duration is experienced on taking cold drinks. The attacks gradually increase in length. They arise spontaneously without external cause, and continue for days, or even weeks, if unchecked by treatment. The pulp then becomes inflamed in consequence of the penetration of pus-producing germs, *inflammation of the pulp*. Finally the delicate tissue dies *in toto,* and the pain then usually ceases for a time.

FIG. 16.

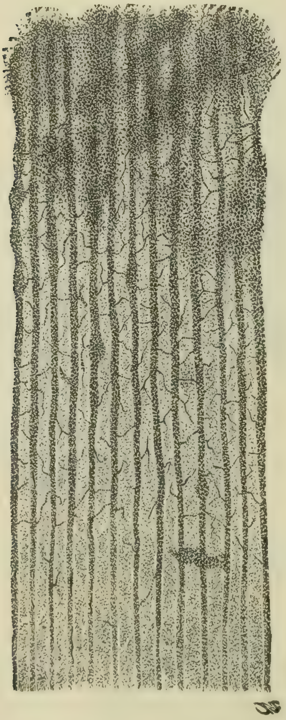


LONGITUDINAL SECTION THROUGH THE FIRST PERMANENT MOLAR (CARIOUS) OF A CHILD AGED SEVEN YEARS. *E*, developmental defect of the enamel; *a* to *d*, various stages of development of the caries. × 10.

But the relief is rarely permanent. Bacteria soon make their way through the apical foramen into the bones of the jaw, and give rise to so-called *pericementitis.* The disease may continue latent a long time without the occurrence of noteworthy symptoms. Sooner or later, often as the result of catching cold, matters grow worse. The tooth seems longer; severe boring pains arise anew, which, unlike the previous, are aggravated by warmth and moderated by cold. They increase especially at night, when warm in bed, to an unbearable degree, while they rapidly decline the next day, especially in the dentist's waiting-room. The next night the pain begins anew. The face on the affected side often swells. Pus forms in the neighborhood of the tooth. The pus most frequently bursts near the apex of the root through the alveolus and gum, and empties into the cavity of the mouth. We are now dealing with a "dental fistula"; the latter, as a rule, remains after the subsidence of the acute symptoms, and constantly discharges pus. The pus may also burst through the cheek, giving rise to a much more uncomfortable fistula of the cheek. The latter never heals without leaving a disfiguring scar.

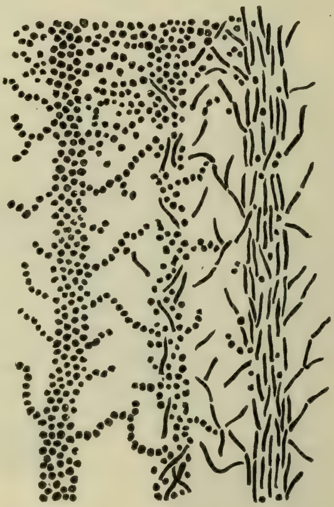
The inflammation of the root membrane of the upper teeth not rarely extends to the neighboring antrum, giving rise to the troublesome affection "empyema of the antrum." The pus may occasionally pass from the lower jaw along the muscles of the neck into the cavity of the chest, and *cause the death of the patient.* Those cases also in which the pus enters the circulation, causing septicemia, are extremely dangerous to life.

FIG. 17.



INVASION OF GERMS ALONG THE DENTAL CANALS. × 250.

FIG. 18.



ORGANISMS LYING IN THE WIDENED DENTAL CANALS. × 1000.

So long as the inflammation of the root membrane remains latent no pain indeed is complained of, but chronic suppuration is maintained. Bone cysts and similar pathological changes of the jawbones are liable to occur.

Inflammatory swelling of neighboring lymphatic glands dates its origin in many cases in diseased roots.

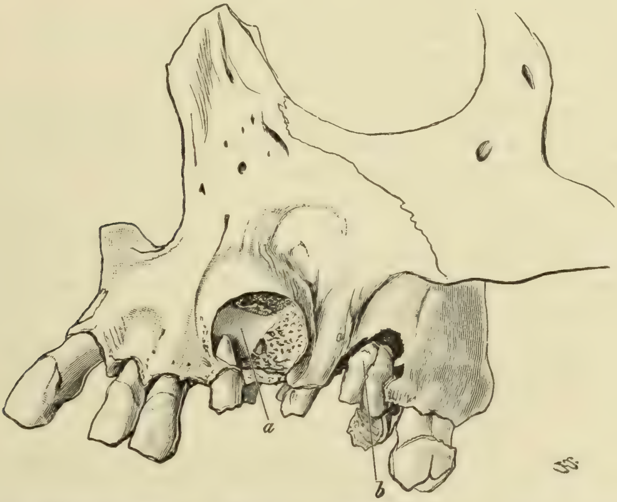
Diseases of the Mucous Membrane of the Mouth.

Diseases of the oral mucous membrane occur at times as local expressions of general diseases, such as tuberculosis, syphilis, scurvy, etc. *Diseases of this membrane are, however, most frequently the direct consequences of inadequate care of the mouth and imperfect mastication.*

Diseased teeth and inflamed mouths are related like mother and child. The mucous membrane not rarely exhibits a diseased appearance in mouths with exceptionally well-developed and healthy teeth.

In consequence of imperfect mastication, "tartar" is deposited, and becomes the cause of inflammation of the mucous membrane. Tartar is especially prone to be deposited upon the necks of the teeth; it constantly tends to extend deeper between the tooth and the gum. Latent purulent inflammation of the edge of the gum may extend to the bony structure of the jaw ("inflammation of the alveolus"). The bony alveolar processes surrounding the tooth disappear; the roots are laid bare; finally the teeth are no longer adequately supported by the jaw; they loosen and fall out.

FIG. 19.



UPPER JAW, AFFECTED THROUGH DECAYING STUMPS AND ROOTS. *a*, cyst; *b*, root which has set up chronic suppuration. Natural size.

Unhappily, the mistaken notion is still common among physicians that tartar is a support to loose teeth, and should therefore not be removed. The physician endeavors to maintain a partially paralyzed foot, through massage and continuous exercise, in a useful condition as long as possible. If a crutch be used too soon and all muscular movements given up, complete paralysis quickly supervenes.

In a similar way loosened teeth are finally rendered completely useless, through the deceptive crutches of dense deposits of tartar.

They are sure to fall out some time with their crutch. If, on the contrary, the tartar be carefully removed, the swollen gums will gradually solidify, and the loosened tooth will become firmer.

The widespread opinion that a deposit of tartar is capable of preserving the teeth from caries is also entirely a mistake. Tartar is deposited from the saliva; it consists almost entirely of phosphate of lime. The false inference that decalcification of the dental structures is impossible in a mouth in which lime is deposited is readily drawn. The inference is a wrong one. Tartar is only deposited at such *superficial* points of the neck from which the oral acids are readily removable by the saliva; that is to say, at points where caries rarely occurs. At inaccessible points of the same tooth, above all in the furrows of the articulating surfaces, caries proceeds unchecked. It thus happens that thick deposits of tartar are often enough found externally, while the crown has been completely destroyed from within.

A healthy oral mucous membrane is the most certain preventive of all forms of contagious diseases.

The large army of pathogenic germs generally gains access to the organism through the cavity of the mouth. A medium better suited for the culture of these germs than a dirty mouth can hardly be imagined. The exciters of pulmonary inflammation are frequently found in unclean mouths. The bacilli of diphtheria are not rarely present there during an epidemic without necessarily infecting the individual. In patients who have recovered from a diphtheritic affection of the throat the dangerous germs can be found upon the mucous membrane weeks, and even months, thereafter. Such individuals are in the first case originally, in the second temporarily, immune to the disease. If the germs are carried to another susceptible person they may give rise in turn to the severest form of the disease.

We now know that *contagious diseases are most frequently communicated by means of the droplets which every individual ejects from the mouth while speaking, sneezing, coughing, and hawking.*

An unclean mouth is a standing menace; not only to the individual himself, but also to those in his environment.

Mediate Causes of Destruction of the Teeth.

Imperfect Structure of the Teeth.

It is not infrequently found that of two children of the same parents, possessing similarly formed jaws, and leading the same lives, one is nevertheless much more liable to disease of the teeth than the other. If the causes of this phenomenon be further sought, it will almost invariably be found that the dental conditions of their parents are very different. Teeth may be well or ill formed. Either variety is hereditary.

Well-formed teeth are the principal weapons in the struggle for existence among wild animals. Wild animals with teeth imperfectly constructed and prone to caries suffer in the development of their bodies as a whole. They either perish early in life, or are prevented from propagation by more powerful rivals. Among wild animals well-formed teeth are thus alone transmitted; caries, therefore, hardly occurs. Among lower races of mankind well-formed teeth are indispensable for the mastication of the coarse food consumed by them. Negroes, Malays, as well as the skulls of our ancestors of the stone age, are accordingly provided with much better teeth than modern Europeans.

A civilized individual with imperfect teeth is enabled more easily to compensate this imperfection by suitable preparation of his food, or, if necessary, by an artificial denture. In the choice of a husband or wife a well-filled pocket-book or a well-developed brain are of greater weight than well-formed teeth. Accordingly, among civilized nations individuals with ill-formed teeth much more frequently come to have children to whom they transmit their own defects.

Deviations in the structure of the teeth are frequently apparent to the naked eye, as a difference in their color. Well-formed teeth are of a brilliant white, or white with a tinge of yellow. Teeth that are ill formed are characterized by a dull color, grayish white, whitish gray, pearl gray, or even bluish gray. Ill-formed teeth, as first established by the writer, occur in soft-water regions deficient in lime more frequently than in hard-water localities rich in that mineral. Poverty of the soil and deficiency in the salts of fluorine and phosphorus in the food appear to exert an unfavorable influence upon the structure of the teeth.

Independent of faults recognizable only by the microscope in the minute structure of the tissues, grosser defects in the surfaces of the teeth (Fig. 16, E) visible with the naked eye also occur, which may favor carious processes.

Unsuitable Hyper-refined Modes of Life and Insufficient Use of the Teeth, especially during Childhood.

It is a demonstrably established fact that *the teeth tend to degenerate with increasing refinement of living.* Our ancestors were brought up on mother's milk. They were strangers to chocolate and other sweets. Tough, thick-crusted rye bread was their daily food.

In proportion as greater demands are made upon the teeth in childhood for masticating tougher food, the milk teeth are found to be longer preserved, the jaws and muscles of mastication better developed. When the permanent teeth come to erupt, adequate room is found prepared for them in the well-developed jaw. The more perfect the dental arch, the less liable are the teeth individually to disease.

Our descendants, on the contrary, in consequence of improper nourishment of the mother, frequently fail, often even while still in the womb, to be supplied with a sufficient amount of those salts which are necessary for the proper development of the teeth and bones. After birth the children are brought up upon artificial food. The disturbances of digestion of the infant, inevitable under such a *régime*, likewise exert an ill effect upon the structure of the still undeveloped crowns of the teeth. In the case of other organs, even the bones, developmental disturbances of the age of infancy may be partially compensated. In the case of the teeth, however, the enamel especially, no such compensation is possible.

It is thus the milk teeth which, in consequence of their imperfect structure, are specially prone to disease. Careful but insufficiently educated parents do all in their power to prevent these teeth from being brought to their highest pitch of functional activity. Even the thin crust of bread is cut away, that the child may spare its tender teeth. Nutrient powders of all sorts are richly supplied. Cod-liver oil is administered by the quart. Chocolate and similar sweets are offered as rewards. Nevertheless, somehow or other, the darlings do not flourish. What may be the reason?

Whoever has had but a single opportunity to compare the oral conditions of wheat- and rye-consuming peoples will have been astonished at the marked differences. Among the former, readily bleeding relaxed gums, irritated by tartar and thick with smeary deposits of mucus and bits of bread; among the latter, gums firm and healthy, teeth white.

Well-baked rye bread should have a crust eight to ten mm. thick.

In former days tasty rye was exclusively used in Germany for bread; to-day pure rye flour is a rarity. The dark-colored flour employed in German cities and manufacturing centers in so-called rye bread (Schwarzbrote) is a mixture of rye flour with an inferior by-product of wheat, barley, spelt oat, or beans. It goes without saying that black bread must be nutritious and tasty, in spite of its hardness, if it is to satisfy the depraved palate of our city dwellers. Coarse commissary or peasant bread, containing the indigestible hulls of the grain, is not always appropriate for weaker urban stomachs, but if the rye be threshed according to the process of Uhlhorn or Steinmetz, and then ground, a good loaf can be prepared which will suit the most pampered palate. In localities where thick-crusted black bread is not used, it is advisable to toast the pieces of white bread upon the surface of the stove. This renders it both harder and more easily digestible. The use of toast bread is general in England. Swedish "Knackabrot," made of pure rye in grains, is of great value for the preservation of the teeth.

Whoever desires to minify the disadvantages which increased refinement of life brings in its train must accustom himself from childhood to masticate as thoroughly as possible. Even children with impaired milk teeth should be accustomed as much as possible to a diet of rough food, and to the proper use of the teeth. It is no valid objection to urge that children cannot be brought to eat coarse bread. Where there's a will there's a way. We may begin with two-year-olds with toasted (or roasted) Zwieback, and we may be assured that the little creatures two and a half to three years of age will consume the toughest crusts with satisfaction.

The child which eats only soft food to save its teeth saves them solely for the dentist's forceps.

Care must of course be taken that any diseases of the milk teeth be promptly attended to. Strange to say, most parents are unwilling to take pains to preserve the milk teeth, for the reason that these must be shed in any case. *Well-preserved milk teeth are at least as important for the nutrition of the child as healthy permanent ones are for that of the adult.*

Diseased milk teeth sooner or later give rise to inflammations of the periosteum, which interfere with the normal development of the permanent teeth within the jaw. If the temporary teeth have to be extracted on account of pain, the jaw-bone remains undeveloped as a whole.

When, under these circumstances, the permanent teeth come to erupt, adequate space for them will be wanting. They necessarily form an irregular arch, which predisposes them the more readily to disease.

Careful preservation of the milk teeth until they are shed is therefore urgently required in the interest of the permanent set.

The softer the farinaceous food is, the easier does it penetrate into the narrow angles and hollows of the denture. The starch is soft when we take it, and almost always mixed with sticky matters, which favor its adhesion to the teeth. Sticky matter of this kind exists as vegetable albumen in all starchy foods, as cacao butter in chocolate, as butter, fat, egg albumen, milk, and compressed sugar in pastry. The bits of soft food left in the mouth excite less discomfort than bits of rye bread. They accordingly are permitted to remain, and give origin to the formation of the noxious acids. In contrast with this, the bits of well-baked, tough rye bread irritate the sensory nerves of the tongue, lips, and cheeks. The offending substances are therefore involuntarily removed, partly through rubbing, partly through suction, aided by a current of saliva.

Narrow Face and Jaws.

Statistics have shown that long-faced individuals suffer on an average more from dental caries than broad-faced ones. The causes of this notable fact are self-evident. The longer the face, the narrower must be the gingival arch, and the more irregular and closely packed are the teeth. Bits of food adhere much more readily in the angles and narrow crevices of such dentures.

Moreover, narrow faces with shallow zygomatic arches possess on the average less powerful masticatory muscles than wide faces with developed zygomata. Individuals in whom these muscles are weak prefer softer food, which they chew less energetically. Consequent upon imperfect mastication, the movements of the lips, cheeks, and tongue, the natural tooth-brushes, are less active.

Predisposing Causes.

The best natural preventive against dental disease is a strong current of alkaline saliva, as it exists during active mastication. If the saliva undergoes an unfavorable change in composition, as in some general conditions like anemia, during the period of bodily development or pregnancy, the tendency to caries increases. Progress of caries depends upon the greater or less resistance which the living cell processes within the dentin offer to the disease. General diseases which diminish the resisting power of the living dental tissues favor more rapid spread of the disease.

It is self-evident that the continuous use of acid remedies, such as hydrochloric acid, acid solutions of iron, etc., must exert an unfavorable influence upon the teeth (where no care is bestowed upon the mouth). The same is true of "grape cures."

As we see, a whole series of circumstances exercise an influence upon the health of the teeth.

An individual with a broad face, inheriting a good denture, brought up in a limestone region, and nourished exclusively upon rye (black) bread will hardly suffer from caries, in spite of complete lack of care of the teeth. A narrow-faced subject, native of a locality deficient in lime, inheriting poor teeth, almost exclusively brought up upon soft wheaten bread, will not be able to preserve his teeth by the most careful attention. He must constantly have recourse to the dentist to repair the ravages of disease.

(To be continued.)

CORRESPONDENCE.

USE OF FORMALDEHYD IN DENTISTRY.

To the Editor of the Dental Cosmos:

Sir,—In an article on the uses and limitations of formaldehyd in dentistry in the February issue of the Cosmos, Dr. Low makes reference to "two cases wherein he employed it for pulp-canals, the result being that it made him cautious to the point almost of abandonment."

I have used formaldehyd and carbolic acid—equal parts—for nearly two years in both blind and fistulous abscesses, with decided success. My method is to thoroughly open up and cleanse the canals, and place a light dressing of above in them, sealing as usual with gutta-percha.

I first used it after an experience somewhat similar to that of Dr. Barrows, with a refractory lower bicuspid. After treating it in the usual manner for some weeks, during which time I had twice filled the canal, I tried a dressing of formaldehyd 35%, ac. carb., pars æq., and left it in for several days.

Finding it comfortable, I restopped the canal and awaited the result, which I was pleased to find satisfactory, enabling me to complete the stopping.

I have also used it with remarkably good effect in teeth which, when opened up, have discharged a large quantity of pus, implying a chronic abscess with large sac.

These cases I treated similarly after evacuating the cavity and leaving a vent for the first sitting. After a few days, I have invariably found that the tooth would take a repetition of the dressing without a vent.

S. Lever.

Sydney, Australia, May 3, 1900.

PROCEEDINGS OF SOCIETIES.

INSTITUTE OF DENTAL PEDAGOGICS.

(Concluded from page 586.)

Dr. Faneuil D. Weisse, dean of the New York College of Dentistry, read a paper entitled "Syllabus for Dental Curriculum," which is printed in full in the Dental Cosmos for May, page 444.

Discussion.

Dr. S. H. Guilford. I think most of the ground covered by Dr. Weisse's paper is already in practical use. In other words, I think the different studies he has outlined are the studies of the usual dental course, and what he has included under each head is what is included in all the colleges I know of. But I was pleased to note he made a special point of one branch which, as he says, has been largely neglected, the subject of physics. He says there are but two institutions of which he knows that even so much as mention it in their announcements. As our institution happens to be one of those, I feel quite highly complimented. The subject of physics is an important one. It is true the elements of physics ought to be taught long before the student goes to the dental college. We are not expected to teach ordinary geography, reading, and writing. The student is supposed to know these things before he comes, and so I have no doubt it will be in a few years after the dental course has been extended that the teaching of physics, except in its higher branches, will not be necessary for a dental college. We can't teach everything, but if the student has been properly prepared we can give him something that will be of use to him. We can teach him how these principles are to be applied in our work and practice. The whole subject includes more probably than a student would care to undertake, as it includes light and optics, and we haven't much to do with that; but we do consider heat and electricity as most important. The subject of dynamics is all-important. We have to consider the application of power and force and resistance, as when we are making artificial teeth and mounting teeth they have to be set in such a way as to serve the purposes of the individual. Wildman, thirty-five years ago, was the first to speak of so arranging artificial teeth that the line of force should fall within the center of gravity, and not outside of it. The line of force must be kept as nearly on the line of the center of gravity as possible. Then, again, as to the mounting of the teeth on blocks and single teeth, frequently the teeth break, and it keeps us busy explaining why that is. I remember an occurrence here in Philadelphia when the Public Buildings were being put up. The architect put heavy blocks of granite in position to support the weight that would rest on them. Everybody looked at them and smiled, and thought they would resist more strain than was to be put on them; but after they climbed up one, two hundred feet, and so on, it was found that portions of the granite blocks were chipping off, and then every one cried that the architect didn't know his business; that he had put stones there of insufficient strength to support the superstructure. The architect said if the people who criticised understood the principle upon which the stones were dressed, they would understand the whole problem. He said it was practically impossible to dress two stones so they would rest at all points, and, knowing that fact, men who dressed them dressed them so that the center should be a little higher than the sides and come together at the point best able to resist pressure. But in this case the stones were dressed in another state, and the instructions of the architect were not carried out, and the result was that the stones chipped. He said there will be no more of that. It is not the weight of the superstructure at all, but the fault of the dressing of the stone; and there has been no chipping since. In grinding blocks I teach the students, as Burchard sets out in his book, to make them so that they touch in the center, where they are the strongest and where they won't break.

That simply brings in the question of dynamics. Take, for instance, the filling of teeth where we are illustrating methods of putting gold in the cavity. We all tell them how to do it, but do we sufficiently impress on their minds why we do it in a certain way; why the gold in front of the plugger is at right angles to the plugger, so we can get the very best result possible? Do we tell them why we do it, so that every plunge or motion of the instrument is toward the center of the tooth, so as to have the effect of pushing the filling in the tooth instead of out? They know it might be pushed out when it is only half-completed, and we should explain why. So in building out the corner of a tooth, we teach them how to build down a corner in gold; and after that is done we want to tell them in the preparation of the cavity how to make as secure an anchorage as possible, and then they should know how to prevent the corner from coming off. The way to prevent the corner from coming off is to prevent any great strain coming on a point that is farthest away from the resistance, and so we have the application of force coming in continually.

In the matter of crown- and bridge-work as you see it here, if you explain to students exactly where the strain on the root comes, and how they can best resist that strain, that is a very important feature; and in the matter of orthodontia we have to deal with it constantly. What kind of force to apply and how much, and the checking or holding that force in power. Did you notice last night how the lecturer spoke of using the chisel, pressing with one hand and holding back with the other? Simply showing how to have control of the force. And so in regulating, we want to apply that force in the right direction, and have the means of stopping or resisting slightly the power we apply. I do not know of a place where a knowledge of physics or an understanding of the basic principles of physics does not come into use, especially the sub-department of dynamics. While we cannot, with our present classes, expect them to understand so very much about it, except those who have had a very liberal education, I think the time is coming when they will know more about the laws of physics, and all we will have to do will be to call their attention to these laws and make them understand how they should be applied.

Dr. J. Taft. The subject or question of curriculum is one that has attracted a great deal of attention, but, after all, not very much has been done in the way of unification or bringing the profession up to the highest attainment in this direction in teaching. Effort has been made during the last three or four years by the National Association of Dental Faculties to bring into harmony the curriculum of the various colleges. The aim has been to ascertain or determine the best plan; the best arrangement of subjects; the appropriate time that should be given to each, and such arrangement of subjects as would best suit the classes taught. Not very much has been attained in this direction. I think this should be borne in mind, however, that this, like many other things, will be of slow growth. After all, we should all endeavor, so far as possible, to secure somewhat of this growth; take the things that recommend themselves to the general concensus of the profession, that present themselves in such a way as to commend themselves thoroughly to the teachers in the profession, and then let them adopt them. For instance, Dr. Weisse has a method that recommends itself to me; it is better than any method I have. Wisdom on my part would be to employ that as far as I can. If we cannot adopt it at once as a whole, take such part as you can and utilize it. If we are anxious to learn, we could in this way make more rapid progress than we have heretofore. There is one obstacle stands in the way in this respect, and that is that those who have been teaching for many years, and along certain lines, have formed a groove from which they find it difficult to free themselves from one method and adopt another; but that ought not to influence the younger teachers. You know how difficult it is to break away from habits of long standing. This is one of the greatest obstacles we meet in securing desirable progress in this matter. If we could all come up to the highest ideal point in teaching and work upon such lines, I am sure we should find our progress, although it has been great, much more satisfactory.

With regard to the subject so fully discussed by Dr. Guilford, that of physics, that is, of course, a subject that commends itself to the attention of every one. We all recognize the principles to which he refers as bearing upon our profession; not only in prosthetic, but in operative dentistry as well. Dentists should understand the principles of the application of force in a great variety of ways. Scarcely ever is a filling put in in which this should not be borne in mind. How is force to be applied to secure the best results, whether from the mallet, hands, or what not? Take a bicuspid tooth where there is a large approximal cavity involving a portion of the crown, a complex filling of that kind, many a time there is failure because of a want of attention in this respect, the application of force. A portion of the occlusal surface sets on the filling, or the opposing tooth comes upon it. It may be a filling well introduced, as far as that goes, but the strain comes upon it at a point that forces it from its position; and many a time, though well anchored, though not dislodged wholly, they are loosened so there is enough space for foreign substances to pass in, and there is a recurrence of decay. In order to avoid that the occlusion should always be noted when the filling is first taken in hand, to determine whether the occlusion is here or there, and then make preparations to meet that. Secure the filling well in place, and then trim the filling and occlude the point so that there shall not be that exercise of force which shall dislodge the filling. That illustrates the importance of noting the application of force, and how it occurs.

Dr. A. H. Thompson. All teachers appreciate the need that we are in to-day of a uniformity of curriculum in our schools. That has been worked upon to some extent by the Faculties Association, because they realize the fact that the different branches and different years of study create considerable confusion. With regard to students going from one college to another, there is great need of uniformity, and this should be reached by comprehensive methods and studies. But it is a matter that must be reached by evolution rather than revolution. I think we should take the matter under consideration and work toward it; not only toward uniformity, but also toward condensation of our work and the elimination of many things almost superfluous.

It has been suggested that we should require some elementary knowledge on the part of students entering our schools; that they should know something of elementary physics, mechanics, and elementary sciences, just as much as the elementary branches of education; and that it should not be necessary for us to take up the simple principles of physics, and then we can proceed to a further elaboration of their ability which will be more satisfactory.

Dr. Weisse, closing. It seems I did not pronounce the word correctly. I said "few," not "two." I did not say there were only two colleges that gave attention to physics. I said a *few*. I have been much pleased with the corroboration of the views I advanced, —viz, my plea for the study of physics. Now, as a matter of fact, as I stated in the paper, but few students enter a dental institution with a proper knowledge of physics. It may be in the future that preliminary educational requirements will cover sufficiently the knowledge of physics to enable the student to understand many points that have to be explained in college, but, as long as it is not so, it seems to me some attention should be given in the dental curriculum to the subject. Of course, in speaking of physics I do not mean the physics of light, etc., as they have no practical bearing on dental work, but physics that have a practical bearing. Physics are constantly called into play, and must be in the thought of every operator. If it is not learned as a preliminary, then some direct attention should be given to it in the dental institution.

With reference to the presentation of this subject, it is not intended as revolutionary. I appreciate perfectly, as I have looked at the evolution of teaching in dentistry for the past thirty-five years, that it is a process of evolution. Nothing can be done by revolution, especially in educational matters. Dental institutions have now been in existence long enough to enable us to take an account of stock as to where we stand in the matter of the educational standard of dental colleges. I was asked to present a syllabus for dental curriculum, and I naturally presented a syllabus up to the present time. Of course that presentation covers much of the field covered by dental institutions in their education of men. It is simply a presentation of where we stand. It is simply a presentation of the heads of the subjects, with the scope of knowledge of these special departments which should be understood by the scientific dental surgeon of to-day. That is all. If many deans and professors of dental colleges were to look over this paper they would say, "We have that, and we have that." Of course you have. We all have it. But the question comes up, having it, let us make a statement of it. How many times do we hear it asked, "What do you teach dental students, anyway? Do you teach them this; do you teach them that?" We have gone through the period when it was asked so much. It is asked less now than at first. But it is still asked by institutions abroad, and by the profession abroad, "What do they teach in dental institutions in the United States? Do they teach dentistry alone, or any foundation of general medicine? What do they teach?"

It makes an educational starting point. How is it with a dental student just advancing upon his studies? He is at perfect sea as to what he is to learn. He sees professor of pathology, of anatomy, of operative dentistry, but he is at sea as to the field. But if he goes to a European country he can pick up a syllabus as published by the German government; he can pick up a syllabus of the examination questions he is to answer, and he knows the field he is to cover. Nothing is presented to the dental student of to-day as to the field he is to cover, except the heads of studies and departments. I do not speak of a series of questions, such as the student can cram up on. No, I believe in facilitating the student in every way possible in getting their education, and I believe you can facilitate that by telling them exactly what they are to learn.

It is not intended that this should be adopted by all institutions in the country. It is simply presenting the scope, the field. It is setting up a landmark, a mile-post, just before the century begins; just now, when we are turning into nineteen hundred, we put up a landmark; this is what is taught by the dental institutions of the United States. All may not conform to it, but it indicates what is being done and the consensus of opinion as to what is required. I request in the paper that it be not left to a single man, but that it be representative; that a committee of three be appointed, and that they select collaborators from the fifty dental institutions of the country, so that the labor will be light on each one. We will ask you to devote four or five hours to it. You can just note down the lecture heads of what you insist on, and present that as a report next year. It might not be perfect; it is not intended to be perfect at once, but it is a starting point. Eighteen hundred and ninety-nine; here we are; this is what constitutes the education of the dental surgeon to-day.

The last day's session was devoted to a symposium of short papers on the use of text-books, by Drs. I. N. Broomell, A. H. Thompson, James Truman, and T. W. Brophy, the discussion on which follows:

Dr. G. E. Hunt. This session has been one of the most profitable of the meeting to me. The subject of text-books is an interesting one. In my opinion, we need a text-book on therapeutics more than anything else at the present time, although it may be because I teach therapeutics that I think that. I wrote out a few comments on Dr. Arnold's paper which I will take pleasure in reading, and to which I hope you will have pleasure in listening.

I confess I am inclined to favor to a degree the recitation or, to use a forgotten phrase, for which I thank Dr. Webster, the Socratic method. It may be argued that we are teaching men, not children. That is true, but yet the teacher who tries to instill inductive reasoning powers into his class of *men* by the lecture system alone will find that he has failed more often than he succeeds. Results are what we want. In my opinion more results will be obtained by elucidating a point by questions than by a lecture alone. I would not advocate the use of a single text-book in all studies. In anatomy I see no reason why Gray or Morris should not be adopted and adhered to. In physiology Flint answers all practical purposes for the assignment of a lesson. In dental anatomy I use Broomell. But in no other branch, so far as my recollection extends at this time, do I believe that we have text-books sufficiently comprehensive to use without more or less elaboration. In pathology I use Barrett, in connection with the Socratic method; and, at times, supplement these with a short lecture. In operative and prosthetic dentistry, crown- and bridge-work, orthodontia,—in fact all those branches pertaining to the art of dentistry,—we have no adequate text-books nor ever will. Any text-book on these subjects must necessarily reflect the views and beliefs of the writer, must be biased by his individuality. That is not true of the scientific subjects. Dental anatomy is dental anatomy, and whether the text-book be written by Black or White or Green or Brown makes no difference so long as the writer states the facts, and the order of presentation are the only points to consider in selecting such a text-book. But outlining a method of treatment for a putrescent pulp immediately introduced the personal element into the question. We do not then have a known *fact* presented by Broomell, Black, Morris, or Gray, but we have the method which has proven most successful in the hands of John Doe or Richard Roe offered for our consideration,—a very different matter. So that in these studies of the art of dentistry the lecture system, supplemented by the recitation system, is the most efficient method. In the scientific branches where a reasonably perfect text-book is available, I believe the recitation system will produce the better results. We have no text-book in many of the scientific branches that fulfills the requirement. If we had, I would be in favor of extending the recitation system farther than it is possible now to do. The advantages of the recitation system have been elaborated by the essayist, and it is unnecessary for me to repeat them. But before closing let me sum up my statements, that no one will misunderstand me.

1. By the "recitation system" I mean a method of teaching in which the student takes an active part.

2. I believe the recitation system is perfectly practicable and superior to any other method, in teaching the scientific branches of the curriculum, if we have the proper text-book for its presentation.

3. I believe that in some of the scientific branches we have no adequate text-book.

4. I believe that in those branches pertaining to the art of dentistry, it is only applicable to a degree, and must be supplemented by more or less elaboration on the part of the professor.

Dr. W. C. Barrett. Dr. Hunt knocked me out by the resolution he offered the other day. I can never find the end of a string in five minutes. I never want to make my first speech in the second one. Some of us remember what Dr. Thompson used to say,—that any one who used a text-book was unworthy of the name of teacher. I do not quite agree with that, yet I think we use text-books too much in our practice. If we use text-books at all it must reflect the personality of the man who teaches. The teacher who tries to teach and does not impress his personality upon the students is not fit for a teacher. He may teach wrong; better do that than not teach at all. You take exception to that. I mean within certain limits. I don't mean to teach falsehood, but that he should teach principles badly better than not at all. He must impress his individuality upon the students. The text-book is useful as a statement of principles, truths, axioms, which are perfectly arbitrary in their character. You learn the multiplication table from the text-book, but you don't learn how to use it in your business. In anatomy a text-book is absolutely essential, because you must learn a description of the bones; but without the bones themselves a text-book may entirely mislead you, and you can have no conception of their form any more than sight can give an idea of harmony. A text-book, then, is limited in its application; exceedingly limited, especially in matters that depend upon experience and observation. In many cases the text-book is a delusion and a snare. Hence, in my opinion, nothing will ever take the place of lectures. Nothing can take the place of elucidation of principles by the teacher himself. The principles which it enunciates are not applicable here, and must be qualified there. There are so many accidental incidents which enter into the problems, and must be considered in proper relations. The text-book can consider but one at a time, and so I say the text-book at times is a delusion and snare. In treatment of alveolar abscess, or any other pathological condition we can conceive, the text-book lays down certain rules. It says a counter-irritant should be used, but there are so many. It may be that tincture of iodin may be indicated for treatment, but there may be other features present which absolutely countermand the use of it, and you must use something else. Hence the text-book which cannot explain the circumstances, which cannot teach students to sum together the different features, add them up and group together all the symptoms, and from the sum of the whole arrive at a conclusion as to what is proper,—I say if it does not do that it cannot teach properly; and the text-book cannot do that. Hence I feel quite antagonistic to the idea which is being urged at the present time, that we should make greater use of the text-books, and that we should eliminate the lecture system and substitute text-books and recitations. I think the idea is all wrong. It is perfectly useful in teaching mathematics and anatomy, but will not answer for pathology and therapeutics.

Dr. H. A. Smith. There is just one point in Dr. Truman's paper I want to call attention to. I understood him to say the better teacher was not necessarily a practitioner. It seems to me the man who is in touch with dentistry as a practitioner is the only proper teacher. At the same time, the teacher too often comes before the class a used-up man, having worked in his office all day. He should give his best services to the class, and that would be after a night's rest, before he goes to his office at all. Professor Abbott told me once he practiced dentistry all day until half-past four, then walked to the college and lectured from half-past four for perhaps an hour. With all his vigor, with all his determination, he was not doing his class justice, was he? If he had gone to the college in the morning and then to his practice, he would have done his class more justice, but then he would not have done justice to his patients. I believe a man who lectures should take a rest between lecturing and office practice. Formerly we had a lot of professors who came when they pleased, and they were not good teachers for that reason, teaching after working all day. We try to pay them now, and have them in the morning, while they are at their best.

In the treatment of pyorrhea alveolaris which was referred to. If there is anything in God's earth the treatment of which is confusing, it is the directions given for the treatment of that; nobody but an experienced practitioner can teach such treatment, and so of many other disorders. So I say only a practitioner is a fit person to teach even anatomy, or any other subject in the curriculum.

Dr. A. E. Webster. Judging from the remarks and the papers, it would seem to resolve itself to this, that it is mental training we want. You don't need to go into detail with a man who has a cultivated intellect. In giving instruction in infirmary practice, never tell a student what you think until he makes a statement for himself. If you do that you have given him a training, and that is what he needs. It is a question of judgment, and if we can make our training so as to cultivate the judgment of the student, making that the idea from the very first day, and so on until the student goes away, we should have no trouble. The student should acquire such mental training that he can determine these things for himself.

Dr. G. H. Wilson. There is one thought I would like to speak of in connection with this matter of teaching, and it is an argument against Dr. Arnold's position; and it seems to me a strong one. It is this, that we express our ideas by words. Some one must use the words. The great object of class teaching is to have the class instructed, not one individual. Now, who can express the idea better, the student who is to be instructed or the professor? If you say the student, then you must say he should be the teacher.

Dr. Webster. I want to say the student is the teacher. That is the point. Make him the teacher. That is just where I differ with the essayist.

The Chairman. In what sense is he a teacher?

Dr. Webster. You arouse him to action. You must arouse interest. Interest is not a mental act. It is impulse. You must arouse impulse of the mind first, and then after interest comes attention. You cannot make yourself give interest. Now, then, it is a question of ideas of one student from the other, and the teacher back and forth. Have interest, and then you will get attention. Without attention you do absolutely nothing.

Dr. W. C. Barrett. The teacher is the one who first suggests the idea?

Dr. Webster. I didn't intend to go into that at all, but it comes this way. You must first put an idea in that student's mind before you can put anything else round about it. The idea is only developed by the student acting on it. He builds around the idea.

Dr. Barrett. Where does he get the initiative?

Dr. Webster. He must have that from perception. It is with himself. He needs development. We go back to the sensation of touch for all things. That, I know, is contrary to all present ideas.

Dr. G. H. Wilson. I think I used the wrong word when I said "teacher." I should have said "professor," or the one who is to impart or stimulate the acquirement of knowledge. If we employ a teacher or professor and pay him a large salary, we shall not be satisfied for him to take a text-book and assign lessons and hear recitations. An assistant of limited resource can do that. But when we pay a man a high price to teach we want one who can bring in all things and give instruction, and not spend time in hearing recitations. He will ask questions, most decidedly.

Dr. W. E. Grant. I wish to say that assistants are of no account at all. They are absolutely of no account. Dr. Webster struck the keynote when he said we must arouse the interest of the student. Ask them questions, and make them answer; and at subsequent lectures question them as to the preceding one. Half of a man's time at least ought to be given to hearing from the students themselves, to see if they have received what he has given them. In that sense the students are the instructors.

Dr. Barrett. That is all very well, but here comes in another point. It depends somewhat on how deep a man's *pond is.* If a man's pump begins to suck air at the end of fifteen minutes, he has got to begin to ask questions. If he is the teacher he ought to be, if he knows his subject thoroughly, he cannot afford to stop to question as a general rule. He should have some one to do his quizzing; not that he can do it as well as the teacher, but because he can give more time to such an exercise. You have an assistant in the laboratory to do the coarse work for you; not but that you could do it better, but you cannot afford to do it, and so with a good teacher.

Dr. G. E. HUNT. I think we are all agreed there should be a combination of the lecture and recitation system. You can bring a point out better by questioning a student on it than by stating it to him.

Dr. H. W. MORGAN. I had not intended to speak. I think the trip to Philadelphia has been worth the treat we have had this morning in these essays on text-books, but I cannot understand the trend of the argument here for the class-room system when each and every one of these essayists have agreed that we have no text-books. We must get text-books first, and then we can go to the class-room. That is the first requisite. I am satisfied that these essays will do good. They will be read by the book-makers in the future before they put their books on the market.

I am agreed with the gentlemen who have spoken as to the blending of the two methods. It is a very bright man indeed who can elicit it from a student's head who does not first have it in his own. I believe that the teacher must have enthusiasm. Enthusiasm is that which indicates the degree of authority, because there is always more or less question when we read an article, especially when the work comes from a teacher made along the line suggested by Dr. Truman in his article, men who are not practical men; men who are not in active practice; men who have been doing this thing year after year, and especially along the line of anatomy they have been doing what? Copying errors, as we have learned by Dr. Cryer's work in the last five or ten years. We are to have a revolution through men like that, who go to nature for their facts. We must work on those lines. It is only the worker who can prepare a book and do the teaching.

Dr. J. TAFT. This subject is undoubtedly of very great interest to us all, and it shows that there is a recognition of the fact that improvement can be made in our methods of teaching. And I am glad to see so much interest, because where there is this interest and this feeling about it, looking about for better methods, they will likely be found. If we should rest content with the methods of teaching of former days, the profession would be in a sad condition. We are dependent for progress in these last years on this very question of inquiry.

As to text-books and other means of instruction, books are used because they contain in their pages the experience of the writers. If the thoughts that are presented here to-day should be placed on paper, would they be any the less valuable? Certainly not. Thought which is placed on the page is just as valuable as though it were spoken, essentially, with this exception, that by the spoken words the personality of the speaker makes an additional impression that cannot be made by the written or printed page. Hence, while I believe principles should be presented in the form of lectures, the comprehension of many students can be aided very much by reading, by illustrations of models and drawings; anything and everything of this kind that can be made serviceable in impressing and drawing out from the student his best thoughts. These are all valuable.

Now as to recitation methods. You have a book here used year after year. Did you ever deliver two series of lectures exactly alike? Have you not been gaining all the time more knowledge? If not, you had better quit teaching. We are learning constantly, and the teacher who does not seek to give to his students the benefit of this growth is falling far short of the thorough teacher. A good teacher will find new material all the while which will be valuable in his work with the students. That places the text-book and the recitation method at a disadvantage. If you follow a text-book two or three years old and bring into it what you have since gained, you remove the greatest objection to the recitation method. My impression is there is no method so good, and that will reach the aspiring, industrious, enthusiastic student as the lecture method. You are constantly adding your accumulating knowledge and giving the student the benefit of it.

I can hardly see the propriety of the method suggested by one of the speakers, that a teacher must stand merely as a pump, and draw out from the student what may be in him. The value of your teaching depends on your own knowledge. Have you no more than the student? If not, where is your superiority? If he has as much as you, how can you help him? If Dr. Webster has the power merely by his presence of communicating knowledge to his students that he possesses himself, it is a wonderful thing. You cannot draw from a student that which he has never had or conceived, and has not a basis upon which to form a conception of the knowledge you wish to give him. I do not think Dr. Webster means to lead astray, but he advocates an impracticable theory which he seems inclined to push to the extreme.

There is one feature that has been left out altogether. Here is a very bright student, comprehending everything you give him at once, ready to take a text-book and make a recitation on it; another student is so dull you have to cram it into him. There is a very great diversity in the ability of students to comprehend what is given them. Men who have been accustomed to mental work will catch the ideas much quicker than one without this training. A bright student is a stimulus and inspiration. How different is the feeling when you see another student half asleep. Somebody said this morning that the students laid down in their seats and went to sleep, and when you wake them up to ask them a question they turn over again and go to sleep. The question is, what shall we do? Some one has said get down to the comprehension of the dullest student you have and work on him. What are the rest doing? This is a problem I have not been able to see through. If we could select for our students all bright, educated, cultured students, whose minds take in and comprehend at once what is given to them, what a glorious thing it would be to be a teacher. But how discouraging it is to take the dull, listless, careless student and endeavor to get it into him by some means or other. Very frequently after repetition you see he does not understand it, and you turn it over and present it another way; and finally you get something into him, but it is exceedingly discouraging.

Dr. WILSON. Do you think it is possible to ask questions of a dull student and draw the knowledge out of him?

Dr. TAFT. I don't think so. If you can't get anything into him, how can you draw it out?

Dr. F. D. WEISSE. I am sorry I was not here earlier. I am delighted with the remarks of Drs. Taft and Morgan. As I understand it, it is the question as to teaching by recitation from lessons learned in the text-book. That is one phase of it. It is my impression and the impression of those with whom I have come in contact that the personality of the lecturer carries great weight. As Dr. Taft said, the lecturer combines in the lecture a great deal of work outside of the lecture. The lecturer combines the mature thought and digestion of many text-books, and the student is not confined to one trend of thought, but the lecturer gives him a concensus of opinion from many authors. I think if students were examined more by the professors it would be much better. It is our method to have weekly examinations, in which the professor meets the class and examines them. He passes around sixty or seventy questions. I can pass around probably sixty in an hour, requiring short answers. Frequently I have the first and second year men together, and if one cannot answer it, the other can. If the second year man cannot answer a question and it is answered by a first year man, that is a triumph for the first year men, and the interest is kept alive. In that way the student is kept in touch with the professor by the questions he asks.

As to text-books, I tell the students in the first lecture how to use the text-book. They work too little with the indexes of their text-books. If you want to work to advantage to get at a subject, turn to the index and find out the page on which that subject is to be found. Find the answer to the question, and when you have read it shut the book. Don't allow the eyes to run beyond that. In that way text-books are valuable.

The CHAIRMAN. It has been quite difficult for me to restrain myself as your presiding officer. I have found it almost impossible to keep still on this subject, because it is one of exceeding interest to me. I know there are others who feel as I do, but our time is limited and we must close the discussion, as the time for adjournment has nearly arrived. I will ask Dr. Arnold to close the discussion, with Drs. Thompson and Brophy to follow him.

Dr. ARNOLD. In writing on text-books, I assumed they were in general use and that they were written for a purpose. I have discovered here that writers of text-books have condemned them. I don't know why Dr. Barrett writes a text-book when he don't expect us to use it.

Dr. BARRETT. I quoted another, not myself.

Dr. ARNOLD. I tried to arrive as near as possible at some plan as to how to use text-books, taking for granted that they were of some value. We must have a foundation to start on. The question came up in discussion as to where a pupil first gets information. He is asked to recite; expected to be a teacher in a certain sense to the rest of the class. I believe with a starting point he might be a teacher to some extent on what he recites, but he must get the foundation from somewhere; therefore I don't see how we can well dispense with text-books. With all their defects we love them still.

The question of bias was mentioned. Is the writer of a text-book any more subject to bias than a professor? Not at all. I think the lecturer may be just as biased in his scientific attainments, and as dogmatic as the writer of a text-book, so I see no especial reason why exception should be taken on that ground. The teacher illustrates and corrects the mistakes that may be in a text-book. Where is the perfect text-book? I don't believe there are any; there is constant necessity for revision. I believe the dental profession uses text-books less than any other profession. I don't see why. We claim to be a learned profession, yet use fewer books than any other profession. I don't think that is quite to our credit. I advocated the combination of oral teaching with the systematic use of the text-book.

Dr. A. H. THOMPSON. The trend of the discussion has not been very desirable. The indication, however, is favorable, in that the desire seems to be toward simplification and coming back to natural methods. We know we must deal often with students who have not ability to understand and comprehend a lecture, and they cannot get it out of the old-fashioned heavy text-books. I think the tendency is very satisfactory, in that there is a desire to simplify and come back to the first principles of scientific methods of instruction.

The newly elected officers were then installed, after which the meeting adjourned.

KANSAS STATE DENTAL ASSOCIATION.

THE twenty-ninth annual meeting of the Kansas State Dental Association was held at Topeka, Kan., May 3, 4, and 5, 1900. The meeting was devoted principally to clinics, many unusually interesting ones being given. The porcelain clinics of Dr. G. W. Schwartz, of Nebraska City, Neb., and Drs. Cronkite and Darby, of St. Joseph, Mo., were of especial interest.

A large number of the leading dentists of Kansas and adjoining states were present. The following officers were elected for the ensuing year: R. Matthews, Wichita, president; O. H. Simpson, Dodge City, first vice-president; E. Bergstresser, Abilene, second vice-president; J. W. O'Bryon, Lawrence, secretary; S. J. Renz, Leavenworth, treasurer.

The date of the next meeting was left to the Executive Committee, the place of meeting selected being Ottawa, Kan.

J. W. O'BRYON, *Secretary.*

ILLINOIS STATE DENTAL SOCIETY.

FOLLOWING are the officers elected for the ensuing year at the thirty-sixth annual meeting of the Illinois State Dental Society, held in Springfield, May 8-11, 1900: J. G. Reid, Chicago, president; M. L. Hanaford, Rockford, vice-president; A. H. Peck, 92 State street, Chicago, secretary; C. N. Johnson, Chicago, treasurer; J. T. Cummins, Metropolis City, librarian. Executive Committee, C. R. Taylor, Streator. Committee on Science and Literature, A. W. Harlan, Chicago. Committee on Art and Invention, H. J. Goslee, Chicago. Supervisor of Clinics, J. E. Hinkins, Chicago. Members of Executive Council (terms to expire 1903), C. B. Sawyer, Jacksonville; M. L. Hanaford, Rockford; C. B. Rohland, Alton. Board of Examiners, C. M. Robbins, Carthage; C. C. Corbett, Edwardsville; S. F. Duncan, Joliet. Committee on Ethics, C. B. Sawyer, Jacksonville; J. D. Nicol, Peoria; Edmund Noyes, Chicago.

HARVARD ODONTOLOGICAL SOCIETY.

At the January meeting of the Harvard Odontological Society the following officers were elected, and at the February meeting were inducted: Dwight M. Clapp, D.M.D., Boston, president; Joseph T. Paul, D.M.D., Boston, recording secretary; Robert T. Moffatt, D.M.D., Boston, corresponding secretary; Lyman F. Bigelow, D.M.D., Boston, treasurer; Harry W. Haley, D.M.D., Boston, editor. Executive Committee, Joseph T. Paul, D.M.D. (chairman), William P. Cooke, D.M.D., Frank T. Taylor, D.M.D.

Robt. T. Moffatt, *Cor. Sec'y.*,
85 Newbury street, Boston, Mass.

NEW DENTAL SOCIETY.

A dental society called the Southern Dental Society of the State of New Jersey has been formed with headquarters in Camden, N. J.

The society has been organized by the dentists practicing in the seven lower counties of the state. It starts with a membership of twenty-three, and meets the third Wednesday evening of each month (excepting July and August), in the Masonic Temple Building. The officers are: J. E. Duffield, D.D.S., Camden, president; O. E. Peck, D.D.S., Bridgeton, vice-president; A. K. Wood, D.D.S., Camden, recording secretary; W. W. Crate, D.D.S., Camden, corresponding secretary; Mary A. Morrison, D.D.S., Salem, treasurer. Executive Committee, A. Irwin, D.D.S. (chairman), Camden; J. J. Halsey, D.D.S., Swedesboro; C. H. Tuttle, D.D.S., E. E. Bower, D.D.S., A. B. Dewees, D.D.S., Camden; J. F. Summer, D.D.S., Bridgeton.

DENTAL COLLEGE COMMENCEMENTS.

MARION-SIMS COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of Marion-Sims College of Medicine were held in the Fourteenth Street Theater, St. Louis, Mo., on Friday evening, April 27, 1900.

The address to the graduates was delivered by Rev. J. W. Day.

The degree of D.D.S. was conferred on the following graduates by Dr. H. J. McKellops:

Louis C. Burgard	Illinois.
John K Conroy	Missouri.
Joseph B. Crist	Kansas.
Robert H. Davis	Kentucky.
Paul E. Eckhardt	Missouri.
Emanuel J. Garcia	Missouri.
Wm. W. Gardiner	Missouri.
Louis E. Hudson	Missouri.
Geo. C. Jones, Jr.	Missouri.
George M. Lark	Illinois.
Geo. H. Mathae	Missouri.
John H. McCain	Arkansas.
F. M. McAlpine	British Columbia.
John L. McClean	Missouri.
Adolph L. Marks, M.D.	Missouri.
Paul E. Pepper	Mississippi.
Edward J. Pohle, B.S.	Wisconsin.
Louis F. Popp	Missouri.
Fred. R. Roemer	Illinois.
Dell W. Shaul, Ph.G.	Indiana.
Jacob Schuck	Missouri.
Howard V. Solis	Illinois.
Wm. M. Wilson, Ph.B.	Missouri.
Geo. B. W. Winter	Missouri.
Arthur E. Wood	Missouri.

KEOKUK DENTAL COLLEGE.

The annual commencement exercises of the Keokuk Dental College (Dental Department of Keokuk Medical College) were held in the opera house, Keokuk, Ia., on Tuesday evening, April 10, 1900.

The doctorate address was delivered by Hon. Hazen I. Sawyer, LL.B., and the valedictory by William E. Creath, D.D.S.

The number of matriculates for the session was sixty.

The degree of D.D.S. was conferred on the following graduates by Professor George F. Jenkins, M.D., president of the college:

Woodford B. Calvert	Missouri.
Wm. W. Cameron	Iowa.
Helen L. Consol	Illinois.
Jos. H. Clark	Missouri.
Ross W. Crawford	Iowa.
Wm. E. Creath	Iowa.
Albert C. Ellison	Missouri.
Chas. R. Hurdle	Illinois.
Hubert P. Neeper	Missouri.
Guy M. Simons	Iowa.
Eric A. Smesrude	Iowa.
Herbert H. Stafford	Nebraska.
Jennie McG. Young	Canada.

UNIVERSITY OF PENNSYLVANIA, DEPARTMENT OF DENTISTRY.

The one hundred and forty-fourth annual commencement exercises of the University of Pennsylvania were held in the Academy of Music, Philadelphia, on Wednesday, June 13, 1900.

The commencement address was delivered by William L. Prather, Esq., president of the University of Texas.

The number of matriculates for the session in the Department of Dentistry was four hundred and eighty-five.

The degree of D.D.S. was conferred by Charles C. Harrison, LL.D., provost of the university, upon the following graduates:

James W. Anderson, Jr.
Cayetano J. Apablasa.
Mario de Arregui.
Frank W. Bailey.
Harry W. Bailey.
Leo W. Baldauf.
Ralph L. Bennett.
Georges Berg.
Charles S. Bertolet.
Henry Bicknell.
Eli J. Birs.
Archibald E. Boice.
Richard W. Bolte.
Frank D. Booker.
William E. Boulter.
Frederick J. Bradburn.
Thomas V. Britton.
John J. Brogan.
William J. Burger.
Joshua D. Cabeen.
Samuel P. Cameron.
William C. Carmany.
Walter C. Carpenter.
John H. Chapman.
Arthur J. Clark.
Robert H. Clifton.
William J. Conklin.
Roy F. Corley.
John M. Crago.
George B. Cross.
Charles A. Dager.
Lester B. Damuth.
Charles C. Dancy.
Walter W. Davis.
Frank P. DeHaven.
John H. Derick.
Solomon De Sola.
Walter E. Dickson.
Vivian F. Downing.
Robert J. Dunsmore.
William S. Edger.
William A. Edwards.
Julio Endelman.
Roland H. Foster.
George G. Free.
William D. Gaither.
Lloyd H. Gaston.
Oscar G. Gerber.
Arnold E. Gibson.
Alfred H. Gilbert.
William O. Gray.
Truman A. Griffin.
Wm. C. F. Groth.
Frederick Haag, Jr.
Martin V. B. Haines.
Albert Hallenberg.
George R. Hanna.
Houston Harlan.
Conrad A. Herwig.
Charles F. Hickox.
Augustus F. Hiskens.
Fred. L. Hunt.
Harry C. Hunter.
Chaim Hurewitch.
Marcus S. Jacobson.
Alfred Jameson.
Albert W. Jarman.
Chas. R. Jefferis, Jr.
William S. Kearney.
John J. Kilpatrick.
Clarence H. Knocke.
Wernhardt C. E. Koch.
Alvin C. Kraenzlein.
Virgilio Lacayo.
Alvah D. Ladue.
Harold B. R. Laing.
Max Landau.
Gilbert F. Laue.
Alfred P. Lee.
E. F. J. H. L'Hardy.
Charles F. Liebrecht.
Clifton E. Lord.
Geo. H. McCloughan.
Hubert P. McGrath.
Fred. S. McKay.
Walter W. McKay.
Philip J. McMahon.
Stanleigh R. Meaker.
William L. Minster.
John A. Miskey.
Alberto R. Moliner.
Charles S. Moore.
Harry L. Morehouse.
Mason K. Moyer.
Geo. W. Myers.
Harman Newell.
Walter R. Noble.
George H. Nottage.
Uno I. A. Nyman.
Geo. E. Partridge.
John E. Patterson.
Harry D. Powelson.
Chas. W. Rausenberger.
Leidy R. Reel.
Daniel S. Reese.
Wm. L. Rider.
Alfred J. J. Riesbeck.
Wm. T. Robinson.
Lewis Rumford.
Otto Russenberger.
George S. Schlegel.
Frank S. Scott.
Francis C. Sebold.
Edward O. Seifert.
Ernest Sherry.
Norman P. Sinclair.
Wilson M. Skinner.
Howard S. Smith.
Isaac G. Snider.
James B. Snover.
Boyd B. Sprout.
Fred. R. Stathers.
Webber W. Still.
Eugene S. Taft, Jr.
William E. Taft.
Arthur G. Thatcher.
Chas. H. Thompson.
Henry E. Trostel.
William E. Turner.
Walter E. Uffenheimer.
Fred. A. Utley.
Frederic R. Wagner.
Arthur F. Webster.
Stephen M. Weeks.
Aurelius F. Wheeler.
Wm. B. Wheeler.
Jean C. Whinnery.
Fred. T. Whitten.
John Wilkinson, Jr.
Harry Winder.
Edwin C. Wisler.
Edward V. Wright.
Thos. C. Wright.
John M. Zook, Jr.

Pittsburg Dental College.

The fourth annual commencement exercises of the Pittsburg Dental College (Department of Western University of Pennsylvania) were held in the Alvin Theater, Pittsburg, Pa., on Tuesday afternoon, May 1, 1900.

The faculty address was delivered by Dr. J. G. Templeton, dean of the college.

The number of matriculates for the session was one hundred and ninety-six.

The degree of D.D.S. was conferred on the following graduates by Chancellor Holland, of the university:

H. J. Alan.
D. F. Anderson.
I. L. Boyd.
G. W. Brace.
C. H. Calvert.
F. L. Conn.
O. G. Crawshaw.
R. M. Craig.
J. L. Crow.
C. C. Dale.
A. E. Dietrich.
R. D. Duncan.
J. S. Earsman, M.D.
W. M. Evans.
J. W. Frazier.
J. L. Fulton.
C. P. Gamble.
Miss M. L. Glenn.
R. J. Hemminger.
W. J. Hindman.
J. R. Hobaugh.
J. M. Holmes.
P. B. Hughes.
H. C. Hum.
C. C. James.
J. A. Kaltenbaugh.
W. H. King.
G. A. Kusler.
Philip Lieber.
W. M. Limber.
C. V. McGill.
W. E. Matlack.
H. G. Meals.
T. C. McConnell.
F. B. McMillan.
R. E. Morrison.
H. H. Myers.
S. T. Owens.
P. G. O'Neill.
D. E. Orwig.
J. S. Peairs.
J. P. Quinn.
D. S. Ramsay.
F. A. Robison.
G. C. Roll.
W. H. Ryland.
J. P. Shaffer.
P. V. Schlag.
P. J. Schusler.
R. F. Simeral.
J. E. Strasser.
I. H. Todd.
R. L. Toy.
R. N. Washabaugh.
J. S. Wells.
J. E. Wilson.
E. L. Yohe.

MISSOURI DENTAL COLLEGE.

The thirty-fourth annual commencement exercises of the Missouri Dental College (Dental Department of Washington University) were held at the Germania Theater, St. Louis, Mo., on the evening of April 26, 1900.

The address to the class was made by Dr. John Egbert Nyman, of Chicago.

The degree of D.M.D. was conferred by Chancellor Chaplin, of the university, upon the following graduates:

Andrew J. Bass	Missouri.
Alfred G. Bauer	Missouri.
John E. C. Bey	Missouri.
Wesley B. Dickson	Missouri.
Freeland J. Dunn	Missouri.
Houston E. Ferrell	Missouri.
John M. Hartmann	Ohio.
Albert W. Heitzig	Missouri.
Robert O. Hirschi	Missouri.
Edward L. Horton	Missouri.
Leonard Q. Henry	Missouri.
Mauzey W. Isle	Missouri.
Howard A. Kehde	Missouri.
Louis H. Kraft	Illinois.
Benno E. Lischer	Illinois.
Joseph E. Long	Illinois.
Eugene McGuire	Illinois.
Elmer H. Matkin	Missouri.
Charles L. Merriwether	Missouri.
Jacob B. Pettibone	Missouri.
Bland N. Pippin	Indiana.
Elmer H. Schwarz	Illinois.
Handy L. Smith	Missouri.
Arthur M. Stockhoff	Missouri.
Frank P. Stone	Missouri.
Clarel S. Straube	Missouri.
John A. Wavrin	Iowa.
Albert W. Wolf	Illinois.
Harry T. Wood	Missouri.
Charles Wyckoff	Illinois.

UNIVERSITY OF BUFFALO, DENTAL DEPARTMENT.

The ninth annual commencement exercises of the Dental Department of the University of Buffalo were held in the Star Theater, Buffalo, N. Y., on Tuesday afternoon, May 1, 1900.

The degree of D.D.S. was conferred on the following graduates by Hon. James O. Putnam, chancellor of the university:

H. C. Bennett	New York.
Chas. F. Bödecker	New York.
Carlyle L. Clark	New York.
Chas. H. Davis	New York.
James B. Gordon	New York.
E. R. Griswold	New York.
William F. Guy	Canada.
James R. Hicks	Canada.
Thos. A. Hicks	Canada.
W. H. Holbrook	New York.
Edw. P. Jones	New York.
Walter G. Kempe	New York.
Chas. S. Kerrick	Pennsylvania.
Mark D. Leonard	New York.
Ralph E. Luther	New York.
Geo. H. Morgan	New York.
Geo. L. Morss	New York.
Rollin A. Newton	New York.
N. C. Powers	New York.
P. F. Prest	Canada.
Fred. J. Ryan	New York.
Jas. A. Sherwood	Canada.
Pliny W. Smith	New York.
Thad. B. Smith, M.D.	New York.
A. L. Thompson	New York.
R. F. Thompson	Canada.
Jos. Vogl, M.D	Austria.
Chas. H. Waldo	New York.
H. S. Waldorf	New York.
Ira L. M. Waugh	New York.

TUFTS COLLEGE DENTAL SCHOOL.

The annual commencement exercises of Tufts College Dental School were held in the college building, Boston, Mass., on Wednesday, June 20, 1900.

The number of matriculates for the session was one hundred and fifty-seven.

The degree of D.D.S. was conferred on the following graduates by President E. H. Capen, of the college:

John R. Baxter	Massachusetts.
Frank A. Besse	Massachusetts.
Edw. V. Bulger	Massachusetts.
John S. Burbank	Massachusetts.
Thos. H. Callaghan	Massachusetts.
Walter E. Chase	New Hampshire.
Horace C. Chester	Massachusetts.
Edwin Collier	Massachusetts.
John J. Creed	Massachusetts.
Charles E. Derby	New Hampshire.
Newton A. De Witt	Massachusetts.
Francis H. Dickie	Massachusetts.
Ervin A. Eastman	New Hampshire.
Edson K. Fish	Vermont.
Selden H. Freeze	New Brunswick.
Chas. I. Gould	New Hampshire.
Michael G. Hackett	Massachusetts.
John A. Hardie	Massachusetts.
Frank A. Hayden	Maine.
Fred. E. Jeffrey	Massachusetts.
Matthew J. Kelley	Massachusetts.
A. L. Lane	Massachusetts.
Jos. Laliberty	Massachusetts.
Clayton R. Marstin	Massachusetts.
Edgar H. Minot	Maine.
John H. McDonald	Massachusetts.
A. E. McDonough	Massachusetts.
J. H. McGahan	Massachusetts
Thos. J. Nugent	Massachusetts.
Eugene F. O'Neill	Massachusetts.
M. J. O'Reilly	Massachusetts.
Clark H. Otis	Connecticut.
Maxwell Powers	Massachusetts.
Marie M. Purdie	New Brunswick.
S. G. Ritchie, B.A.	New Brunswick.
Fred. G. Santom	Massachusetts.
Carlton M. Saville	Massachusetts.
Harman B. Soule	Vermont.
Oscar M. Springer	Austria.
Martin C. Tracy	Vermont.
Irving J. Wetherbee	Massachusetts.
Charles H. Webb	Massachusetts.
Chas. H. Wellman	Vermont.
W. C. Whittemore	Massachusetts.

NEW ORLEANS COLLEGE OF DENTISTRY.

The first annual commencement exercises of the New Orleans College of Dentistry were held in Tulane Hall, New Orleans, La., on Monday evening, June 4, 1900.

The annual address was delivered by Hon. Henry M. Gill.

The degree of D.D.S. was conferred by the dean, Jules J. Sarrazin, D.D.S., upon the following graduates: H. J. Arledge, J. T. Lampkin, and J. N. Mathison.

KANSAS CITY DENTAL COLLEGE.

The eighteenth annual commencement exercises of the Kansas City Dental College were held in the Auditorium, Kansas City, Mo., on Monday, April 30, 1900.

The annual address was delivered by Hon. James A. Reed.

The number of matriculates for the session was one hundred and fourteen.

The degree of D.D.S. was conferred on the following graduates by J. D. Patterson, D.D.S., president of the faculty:

William E. Austin	California.
John K. Bishop	New Mexico.
Robert H. Bowers	California.
Chas. L. Connolly	California.
John A. Dillon	Kansas.
Henry K. Enloe	Missouri.
Del Monte T. Gants	Kansas.
Albert E. Gossard	Kansas.
Calvin E. Hazen	Kansas.
Geo. B. Humfreville	Kansas.
Fred. E. Iserman	Kansas.
Geo. H. Keim	Kansas.
Ernest L. Loring	California.
Claude L. Mayes	Missouri.
William E. McCue	Missouri.
Adolph B. Michaels	Kansas.
Jerman C. Park	Missouri.
Eugene B. Pierce	Kansas.
Thos. M. Robertson	Kansas.
Alfred C. Stratton	South Dakota.
Joseph Tomiska	Nebraska.
David Walker	Arkansas.
Chas. P. Warner	Missouri.
Harold C. Weddle	Missouri.
George D. Wertz	Missouri.

UNIVERSITY OF MINNESOTA, COLLEGE OF DENTISTRY.

The twelfth annual commencement exercises of the College of Dentistry, University of Minnesota, were held in the Armory, on the Campus, Minneapolis, Minn., on Thursday, June 7, 1900.

An address was delivered by President Cyrus Northrop.

The degree of D.M.D. was conferred on the following graduates by President Northrop:

Eugene F. Adams	North Dakota.
Frederick E. Andersen	Minnesota.
Harry W. Bertram	Minnesota.
Theodore C. Busse	Minnesota.
Hanphen H. Carlson	Minnesota.
Joseph Clarke	Minnesota.
Herbert C. Cooper	Minnesota.
Elbert P. Costain	Minnesota.
William Gloyd	Minnesota.
Charles A. Hintz	Minnesota.
Karl H. Hoorn	Minnesota.
Robert C. Hutchin	Minnesota.
Benj. G. Kroehler	Minnesota.
Albert L. Kershaw	Minnesota.
John F. Knudson	Minnesota.
Ralph L. Lamphere	Minnesota.
Harvey J. Lockhart	Minnesota.
Edward E. Munns	Minnesota.
Harold J. Nelson	Minnesota.
Louis Nelson	Minnesota.
George W. Norris	Minnesota.
Carl G. Olson	Minnesota.
Aeneas Owre	Minnesota.
John F. Patterson	Minnesota.
Aris L. Revell	Minnesota.
Frank F. Riley	Minnesota.
Oscar E. Roberts	Minnesota.
E. F. Sommermeyer	Wisconsin.
Dan E. Sprague	Minnesota.
Anton W. Swanson	Minnesota.
Harry E. Thomas	North Dakota.
Axel A. Thorsen	Minnesota.
Homer A. Tyler	Minnesota.
Morse K. Whittemore	Minnesota.
Robert B. Wilson	Minnesota.
Otto E. Zieger	Minnesota.

WESTERN RESERVE UNIVERSITY, DENTAL DEPARTMENT.

The annual commencement exercises of the Western Reserve University were held June 14, 1900, in Beckwith Memorial Church, Cleveland, Ohio.

Rev. Lyman Abbott, of New York, delivered the address to the graduates.

President Charles F. Thwing, of the university, conferred the degree of D.D.S. upon the following graduates:

George D. Allison.
Frank L. Bishop.
Roland G. Borland.
Leon D. Boylan.
John D. Bunn.
Wm. R. Burkhart, M.D.
Harold M. Clapp.
Richard E. Currie.
Homer C. Darrah.
Will F. Diffenbacher.
James T. Doyle.
Earl B. Duffy.
James L. Dusek.
Frederick G. Eggert.
Frank B. Elder.
Gustave T. Fuenfstueck.
John I. Gilmore, M.A.
Peter A. Haas.
Will C. Hall.
Dale R. Jacobs.
Thomas J. Jones.
Richard H. Lindhorst.
William A. Morris.
Wm. A. Nichols.
Albert O. Osborne.
Otto J. Schneider.
Clyde L. Smith.
Francis L. Stentz.
Theodore H. Terry.
Willard B. Tiffany.
James F. Wark.

OHIO COLLEGE OF DENTAL SURGERY.

The fifty-fourth annual commencement exercises of the Ohio College of Dental Surgery were held in the Odeon, Cincinnati, Ohio, on Thursday evening, May 10, 1900.

An address was delivered by Dr. Richard G. Boone, superintendent of public schools, and the class address was by Clarence N. Miles, D.D.S.

The number of matriculates for the session was two hundred and twenty-two.

The degree of D.D.S. was conferred on the following graduates by Dr. D. W. Clancey, vice-president of the board of trustees:

Earl J. Allen	Ohio.
Thos. A. Anderson	Kentucky.
J. W. Autenrieth	Indiana.
William Bailie	Kentucky.
Edw. E. Bartram	Kentucky.
Geo. S. Blanchard	Ohio.
Harry C. Brown	Ohio.
Jno. A. Brumfield	Indiana.
Harry G. Butcher	Ohio.
A. F. Campbell	Indiana.
Ezra J. Cassell	Ohio.
Warren M. Clawson	Pennsylvania.
A. T. Cole	Pennsylvania.
Wm. J. Cooke	Ohio.
Arch. J. Crawford	Canada.
Carl F. Crecelius	Indiana.
Perry N. Crittenden	Michigan.
Jos. A. Dodson	Kentucky.
Jas. H. Eagleson	Illinois.
Harry Eastman	Ohio.
Orville J. Fetter	Ohio.
Robt. C. Graham	Tennessee.
Elmer J. Hamilton	Indiana.
Chas. R. Hammat	West Virginia.
Wm. R. Hardin	Illinois.
Zeno W. Heizer	Ohio.
Roy W. Hellwarth	Ohio.
J. H. Huschart	Ohio.
Frank C. Iams	Pennsylvania.
Chas. E. Isaac	Canada.
Chas. G. Kelly	Illinois.
Edward J. Kilian	Indiana.
Herbert B. Loper	Indiana.
Neil P. Mac Dermid	Canada.
Horton J. Maxwell	Michigan.
Wm. D. McCarty	Ohio.
A. C. McCormick	Ohio.
Jas. R. McCormick	Ohio.
Hartley U. McCurdy	Kansas.
Clarence N. Miles	Ohio.
John D. Nelson	New York.
Fred. M. Owens	Minnesota.
David M. Patton	Ohio.
Galen C. Perin	Ohio.
Adrian C. Pfouts	Ohio.
Edith Sayler	Ohio.
H. E. Schellenger	Ohio.
Carl C. Schenck	Ohio.
Walter H. Scherer	Kentucky.
Walter H. Siegfried	Ohio.
William A. Shea	Canada.
Percy Shinneman	Kansas.
Cary M. Snowberger	Indiana.
Harley G. Spitler	Ohio.
Harry W. Steen	Ohio.
Frank E. Taffner	Michigan.
Bayard R. Taylor	Ohio.
Hugh B. Thomas	Indiana.
Carl E. Uhle	Ohio.
E. G. Weisenburger	Ohio.
Jesse A. Woofter	West Virginia.
Harry L. Wright	Indiana.

ATLANTA DENTAL COLLEGE.

THE annual commencement exercises of the Atlanta Dental College were held in the Grand Opera House, Atlanta, Ga., on Wednesday evening, April 25, 1900.

Dr. William Crenshaw, dean of the college, read his annual report, and the valedictory was delivered by E. B. McDade, D.D.S.

The number of matriculates for the session was one hundred and seventy-five.

The degree of D.D.S. was conferred on the following graduates:

E. P. Alford	South Carolina.
D. C. Burson	Alabama.
C. M. Barnwell	Georgia.
J. W. Bacon	Louisiana.
D. M. Bruner	Alabama.
Fred. Bize	Georgia.
E. N. Bigham	Mississippi.
J. F. Brunson	Louisiana.
S. D. Bowman	Georgia.
P. N. Cyr	Louisiana.
F. W. Craven	Florida.
P. M. Carmichael	Georgia.
J. A. Cole	Georgia.
J. D. Crenshaw	Alabama.
C. N. Chambers	Georgia.
H. B. Dowling	Alabama.
C. T. Dowling	South Carolina.
L. W. Dancey	Louisiana.
J. R. Franklin	Georgia.
Horace Gray	Georgia.
Paul Gray	Florida.
N. O. Gunter	South Carolina.
C. M. Hiers	South Carolina.
J. W. Hatcher	North Carolina.
W. E. Hicks	Texas.
J. B. Hopkins	Georgia.
J. W. Jordan	Georgia.
Manning Kirkland	Georgia.
W. E. Lambright	Georgia.
J. G. Langston	Louisiana.
J. W. Lovelace	Georgia.
W. E. McCord	South Carolina.
D. H. McNeill	Alabama.
E. B. McDade	Georgia.
Lee McIntosh	Louisiana.
John McCormick	Mississippi.
W. C. Miller	Georgia.
R. J. Merritt	Georgia.
C. W. Regan	North Carolina.
S. L. Rivers	Arkansas.
I. R. Stone	Tennessee.
O. W. Swicord	Georgia.
W. H. Stewart	Georgia.
Arch. Somerville	New Mexico.
C. L. Thompson	Louisiana.
P. E. Tanner	Louisiana.
W. H. Warrenfels	Tennessee.
G. W. Woodbury	Georgia.
W. P. White	Georgia.
J. D. Williams	Georgia.

MEDICO-CHIRURGICAL COLLEGE OF PHILADELPHIA.

THE annual commencement exercises of the Medico-Chirurgical College were held in the Academy of Music, Philadelphia, Pa., on Saturday, May 19, 1900.

The doctorate oration was delivered by George Edward Reed, LL.D., president of Dickinson College.

The degree of D.D.S. was conferred on the following graduates by Professor John V. Shoemaker, M.D., LL.D., acting president of the board of trustees:

Harley Ackerman	Pennsylvania.
Franklin E. Buch	Pennsylvania.
Jno. C. Dougherty	Pennsylvania.
Bert Doyle	Maine.
Robt. M. Ewing	Pennsylvania.
Irvin F. Fegley	Pennsylvania.
Jos. C. Gallagher	New York.
Leon Gismore	Pennsylvania.
Henri E. Gobeille	Rhode Island.
Fred. K. Grandy	New York.
John B. Jones	Pennsylvania.
Chas. E. Koehler, Jr.	Pennsylvania.
Mark Marcus	Pennsylvania.
William Meter	Pennsylvania.
Raymond S. Miller	New Jersey.
Chas. F. Pierce	Pennsylvania.
R. R. Robinson	Pennsylvania.
Jos. L. Rutter, Jr.	Pennsylvania.
Jas. F. Spencer	Massachusetts.
Chester T. Starr	Pennsylvania.
Harry Truitt	Pennsylvania.
Alanson U. Welch	Pennsylvania.

UNIVERSITY OF CALIFORNIA, DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of the University of California were held, in connection with the other departments of the university, on Wednesday, May 16, 1900.

The address to the graduates was delivered by the president of the university, Benjamin Ide Wheeler, Ph.D.

The number of matriculates for the session was one hundred and forty-five.

The degree of D.D.S. was conferred on the following graduates:

Frank W. Anderson	California.
Walter P. Austin	California.
Gottfrid Bergstrom	Sweden.
Julien R. Bernheim	California.
Daniel E. Blackburn	California.
Edward J. Broad	California.
Paul M. Burns	California.
Edwardo Caceres	Central America.
T. M. Carmichael	California.
Geo. H. Casaday	California.
D. H. Cockerton	California.
P. S. Cummings	California.
Alice M. Davis	Oregon.
Jos. H. Doyle	California.
Hubert C. Eller	California.
Chas. E. Farman	California.
John H. Finley	California.
John W. Ginno	England.
Jas. L. Halsted, Jr.	California.
Arthur E. Hackett	California.
Chas. S. Hardy	California.
Jas. M. F. Hocker	California.
Francois L. M. Hus	California.
Anna D. Joost	California.
David H. Leppo	California.
Albert F. Lucchetti	California.
Frank M. Madden	California.
Herbert S. Meyer	California.
John M. McClish	California.
Christ. J. Morgan	California.
Edna F. J. Moore	California.
Alvah N. Morgan	California.
Totaro H. Ohhara	Japan.
Daniel A. Ostrom, Jr	California.
Geo. H. Phillips	California.
Henry J. Phillips	California.
Wallace W. Reading	California.
Fred. J. Rulison	Nevada.
John H. Scott	California.
Henry C. Soher	California.
John C. Somersett	California.
Marion L. Tobriner	California.
Wm. M. Tryon	California.
Frank Vaughan	Oregon.
Chapman M. White, Jr.	California.
Eugene G. Woolsey	California.

NEW YORK COLLEGE OF DENTISTRY.

The thirty-fourth annual commencement exercises of the New York College of Dentistry were held in the hall of the Young Men's Christian Association, New York city, on Monday evening, May 14, 1900.

The address to the graduates was delivered by Rev. Thomas R. Slicer, D.D., and the valedictory by William A. Buckley, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Rev. George Alexander, D.D., president of the board of trustees:

Herbert D. Ayers	Connecticut.
Frederic H. Bleyer	New York.
Henry Brandt	New York.
Samuel W. Brush	New York.
Wm. A. Buckley	New York.
John Chester	New York.
John P. Cole	New Jersey.
Percy S. Doty	New Jersey.
Geo. C. Douglass	New York.
Louis J. Dowd	New York.
Elmer A. Giddes	New Jersey.
Albert J. Grinan	New York.
Karl B. Kloer	New York.
Edwin V. Morrison	New York.
Stephen J. O'Brien	New York.
M. V. Sacharoff	New York.
Mark A. Schwartz	New York.
Jas. W. Springsted, B.A.	New York.
Geo. B. Terrell	Connecticut.
DeRuse S. Tillou	New York.
Chas. W. Vail	New York.
Samuel W. Van Saun	New York.
Inzer B. Wyatt	Alabama.

UNIVERSITY OF IOWA, DENTAL DEPARTMENT.

THE eighteenth annual commencement exercises of the Dental Department of the University of Iowa were held in the opera house, Iowa City, Ia., on Monday, June 4, 1900.

An address was delivered by Governor Leslie M. Shaw.

The number of matriculates for the session was one hundred and twenty-eight.

The degree of D.D.S. was conferred on the following graduates by President George E. MacLean:

Esther Brown.
Ernest W. Browning.
W. L. Devaney.
Clement J. Dexter.
Cecil L. Eller.
John A. Fairall.
Howard T. Gibford.
Thomas R. Griffis.
Geo. D. Goodenough.
Edward A. Hall.
Alois M. Hasek.
Alliene M. Holson.
Earle R. Holson.
Thomas Kelley.
Wm. H. Kenderdine.
Albert C. Knowles.
Wm. I. Lockhart.
Orman E. McCartney.
Judd A. Mentzer.
Fred. E. Overholt.
Leroy J. Oldaker.
D. C. Parsons.
Levin S. Peek.
Rutherford B. Shannon.
Roy T. Will.
Arthur S. Young.

DETROIT COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Detroit College of Medicine were held in the opera house, Detroit, Mich., on Thursday afternoon, June 14, 1900.

Addresses were delivered by J. L. Young, D.D.S., and Hon. Philip T. Van Zile. The valedictory was by A. M. Ritchie, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Hon. Sidney D. Miller, president of the college:

L. G. Banghart.
A. Bentson.
G. G. Brown.
C. S. Brown.
J. J. Brownlee.
P. C. Bruner.
H. Charbonneau.
G. L. Cole.
J. J. Crawford.
H. P. Czishke.
H. H. Dudley.
J. L. Gibson.
J. R. Kirkwood.
O. J. Lasenby.
A. A. Lauppe.
E. R. Lee.
W. Mann.
C. M. McArthur.
W. H. McCormick.
J. F. McQueen.
V. H. L. Newell.
J. Norris.
W. J. Penman.
A. M. Ritchie.
T. W. Robson.
G. A. Stark.
F. W. Stellwagen.
C. F. Stewart.
G. C. Wallace.
J. A. Walker.
N. K. Walter.
W. Wigle.
F. Whitney.
E. Young.

NORTH PACIFIC DENTAL COLLEGE.

THE annual commencement exercises of the North Pacific Dental College were held in the assembly hall of the high school, Portland, Ore., on Tuesday evening, May 1, 1900.

Addresses were made by Drs. S. J. Barber and H. W. Kellog, and the charge to the class was delivered by Dr. J. W. Hickman, of Tacoma, Wash.

The number of matriculates for the session was eighty-six.

The degree of D.D.S. was conferred by Dr. A. R. Cox upon the following graduates, all of the state of Washington: Charles A. Custer, William A. Davison, C. Vodra Davis, Lafayette Nail, and Charles A. Short.

UNIVERSITY OF TENNESSEE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Tennessee were held in the Vendome Theater, Nashville, Tenn., on Thursday evening, April 26, 1900.

The address to the graduates was delivered by Rev. Lancing W. Burrows, D.D., and the valedictory by F. Leonard Sims, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Charles W. Dabney, Ph.D., LL.D., president of the university:

Alvin B. Anderson	Tennessee.
Jno. N. Bagley	Alabama.
Jno. P. Bass	Missouri.
Marcus D. Black	Mississippi.
H. A. Box	Tennessee.
J. W. H. Belote	Tennessee.
Lewis V. Brady	Kentucky.
Theo. P. Bringhurst	Tennessee.
Chas. T. Carney	Tennessee.
E. O. Chambers	North Carolina.
Jno. H. Cooper	Tennessee.
Robert F. Ebert	Missouri.
Clark H. Griffin	Georgia.
Moses V. Gray	Arkansas.
Richard N. Harwood	Tennessee.
W. D. Hennesey	Florida.
Jno. F. Hammet	Arkansas.
Wm. D. Jaccoway, Jr.	Arkansas.
Fielding N. Luck	Virginia.
Jno. W. Lee	Tennessee.
H. N. McGauhey	Mississippi.
F. Leonard Sims	Arkansas.
Wm. N. Thornton	Tennessee.
Geo. W. Warren	Tennessee.
A. Alonzo Wormack	Tennessee.

NATIONAL UNIVERSITY, DENTAL DEPARTMENT.

THE sixteenth annual commencement exercises of the Dental Department of National University were held in the National Theater, Washington, D. C., on Wednesday evening, June 6, 1900.

The address to the graduates was delivered by Professor C. T. Caldwell, M.D., and the valedictory by Thomas L. Clear, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Professor Thomas Wilson, LL.D., secretary of the Board of Regents:

Seibert D. Boak	West Virginia.
Thos. L. Clear	Illinois.
Mark O. Davis	Maine.
Geo. L. Edmons	Virginia.
Wm. G. R. Lea	Virginia.
F. N. Libbey	Wisconsin.
Wm. J. Manning	Massachusetts.
Jas. L. Manire	Tennessee.
D. H. Moran	District Columbia.
Wm. A. Murray	District Columbia.
Edw. J. Scanlon	New York.
Geo. F. Simpson	Virginia.
B. L. Taylor	Kansas.

COLUMBIAN UNIVERSITY, DENTAL SCHOOL.

THE annual commencement exercises of the Dental School of Columbian University were held in the New National Theater, Washington, D. C., on Monday evening, May 28, 1900.

An address was delivered by W. F. R. Phillips, M.D.

The degree of D.D.S. was conferred on the following graduates:

Alex. P. Bacon.
Paris E. Brengle.
Ernest M. Colvin.
Chas. W. Cuthbertson.
Edwin W. Greene.
Chas. A. Hughes.
Horace E. Perlie.
H. N. Van Voorhis.
J. K. Wallace.
Franklin Welch.
Horace W. Whittaker.
Frank H. Wolven.
James R. Yates.

NEW YORK DENTAL SCHOOL.

THE annual commencement exercises of the New York Dental School were held in the Academy of Medicine, New York city, on Tuesday, May 8, 1900.

The number of matriculates for the session was forty-nine.

The degree of D.D.S. was conferred on the following graduates:

Fordyce B. Arvine	New York.
Charles L. Fox	New York.
Ernest R. Gray	New Jersey.
John W. Hess	Pennsylvania.
Geo. H. Leggett	New York.
Wm. B. Lester	New York.
Emil G. Raeder	New York.
Edwin J. Spengeman	New York.
Guy A. Stewart	New York.
Harold A. Welcher	New Jersey.
Herbert S. Worth	New York.

VIRGINIA SCHOOL OF DENTISTRY.

THE annual commencement exercises of the Virginia School of Dentistry (Dental Department of the Medical College of Virginia) were held in the Academy of Music, Richmond, Va., on Thursday, May 10, 1900.

The number of matriculates for the session was twenty-two.

The degree of D.D.S. was conferred by the dean, Christopher Tompkins, M.D., upon the following graduates, all of Virginia: H. D. Atkinson, C. L. DeVaney, S. F. Hart, E. W. Shackelford, and W. M. Stith.

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DENTAL SOCIETY ANNOUNCEMENTS.

MISSOURI STATE DENTAL ASSOCIATION.

THE thirty-sixth annual meeting of the Missouri State Dental Association will be held at Louisiana, Mo., July 10, 11, 12, 13, 1900. A cordial invitation is extended to all reputable dentists to be present and participate in the proceedings and become members of the association.

All railroads in the state have granted a one and one-third fare on the certificate plan. The Palmer House has made a rate of $1.50 and $2.00 per day.

ESSAYS AND DISCUSSIONS.

Hon. Champ Clark. Address of welcome.

Dr. W. L. Reed, Mexico. President's address. Discussion opened by Drs. F. M. Fulkerson, Sedalia; F. H. Achelpohe, St. Charles.

Dr. W. H. De Ford, Cedar Rapids, Ia. "Necrosis involving the Alveolar Process, Superior Maxillary, Nasal, and Palate Bones, resulting from Maltreatment of an Alveolar Abscess." Discussion opened by Drs. J. E. Cravens, Indianapolis, Ind.; A. M. Tutt, Liberty.

Dr. J. B. Chaffee, Carthage. "Things I have Noticed and Other Things." Discussion opened by Drs. W. M. Carter, Sedalia; J. B. McBride, Springfield.

Dr. Ira B. Crissman, Chicago. "Relation of Dental Colleges to the Profession and General Public." Discussion opened by Drs. D. R. Stubblefield, Nashville, Tenn.; E. N. La Veine, Kansas City.

Dr. Harry M. Hill, St. Louis. "The Material, Porcelain." Discussion opened by Drs. C. H. Darby, St. Joseph; D. O. M. Le Cron, St. Louis.

Dr. H. E. Zorn, De Soto. "Finished Dentistry." Discussion opened by Drs. George A. Bowman, St. Louis; George H. Belding, Calmer, Ia.

Dr. M. D. Hamisfar, Warrensburg. "Bacteriology and Pathology—Their Relation." Discussion opened by Drs. W. H. De Ford, Cedar Rapids, Ia.; H. Prinz, St. Louis.

Dr. John G. Harper, St. Louis. "Incidents in Practice." Discussion opened by Drs. T. W. Pritchett, Whitehall, Ill.; R. J. Winn, Bolivar.

Dr. H. H. Sullivan, Kansas City. "Open-faced Gold Crowns." Discussion opened by Drs. Wm. Conrad, St. Louis; E. G. Simmons, Farmington.

Dr. R. C. Brophy, Chicago. "The Universal Tooth." Discussion opened by Drs. W. E. Tucker, Springfield; W. F. Lawrenz, St. Louis.

Dr. Chas. L. Van Fossen, Kansas City. Subject to be announced. Discussion opened by Drs. Ira B. Crissman, Chicago; W. W. Cleveland, Louisiana.

Dr. C. D. Lukens, St. Louis. Lantern lecture, "Orthodontia." Discussion opened by Drs. J. E. Hinkins, Chicago; Geo. A. McMillen, Alton, Ill.

Dr. D. J. McMillen, Kansas City. "Preparation of Cavities and Filling with Non-cohesive and Cohesive Gold Foil." With illustrations. Discussion opened by Drs. B. G. Stevens, Hannibal; M. R. Windhorst, St. Louis.

Dr. J. T. Fry, Moberly. Subject to be announced. Discussion opened by Drs. N. H. Gaines, Independence; P. H. Eisloffle, St. Louis.

Dr. D. Forr, Liberty. "Questions on Methods and Practice." Discussion opened by Drs. E. E. Shattuck, Kansas City; W. W. Berkhead, Louisiana.

CLINICS. SECOND DAY, 9 A.M.

Dr. J. E. Cravens, Indianapolis, Ind. Alveolar Periostitis.

Dr. J. E. Hinkins, Chicago. Contour Moss-Fibre Gold Filling.

Dr. D. R. Stubblefield, Nashville, Tenn. Operative and Prosthetic Technics.

Dr. R. C. Brophy, Chicago. Table Clinic—Dentenax "Slotted" Teeth.

Dr. M. R. Windhorst, St. Louis. Filling with New Process Gold, Demonstrating S. S. White Mechanical Mallet.

Dr. T. W. Pritchett, Whitehall, Ill. Contour Amalgam Fillings in Molars or Bicuspids.

Dr. F. F. Fletcher, St. Louis. Table Clinic—Post Anchorage for Pulpless Teeth in Bridge-Work.

Dr. J. W. Hull, Kansas City. Immediate Pulp Extirpation without Cataphoresis.

Dr. Geo. H. Belding, Calmer, Ia. Gold Filling, using Hand-Mallet.

Dr. W. W. Cleveland, Louisiana. Swaged Metal Plate from Plaster Model.

Dr. Clinton B. Helm, Rockford, Ill. Gold Filling, using Bonwill Mallet.

Dr. D. O. M. Le Cron, St. Louis. Table Clinic—Porcelain Inlay, Crown- and Bridge-Work.

Dr. D. J. McMillen, Kansas City. Combination Cohesive and Non-Cohesive Gold Filling.

Dr. W. W. Berkhead, Louisiana. Pyorrhea.

Dr. H. H. Sullivan, Kansas City. Open-faced Gold Crowns.

Dr. W. L. Bridgeford, Macon. Contour Gold Filling.

Dr. John G. Harper, St. Louis. Method of Swaging Backings for Porcelain-faced Crowns.

Dr. E. W. Stevens, Cameron. Corners and Fillings from Gold Plate, for Incisors and Cuspids.

Dr. J. L. Clark, Pleasant Hill. Bridge for Tilting Molars.

THIRD DAY. CLINICS, 9 A.M.

Dr. Ira B. Crissman, Chicago, Ill. De Trey's Crystal Gold Filling in Labial Cavity.

Dr. W. F. A. Schultz, St. Louis. Operation for Necrosis resulting from Abscessed Antrum.

Dr. Geo. A. McMillen, Alton, Ill. Table Clinic—Practical Crown-Work.

Dr. J. S. Letord, Kansas City. Demonstration Working Qualities of Eaff's Gold for Filling.

Dr. N. H. Gaines, Independence. Treatment of Exposed Pulp and Filling with Cement.

Dr. Chas. L. Van Fossen, Kansas City. Removable Facings for Crown- and Bridge-Work.

Dr. H. Prinz, St. Louis. Application and Manipulation of Mummifying Paste.

Dr. R. J. Winn, Bolivar. Contour Gold Filling, No. 4 Foil, Heavy Mallet.

Dr. W. W. Flora, Carthage. Swage Metal Plate over Plaster Cast.

Dr. J. C. Pasqueth, Mexico. Gold Filling, Gingival Cavity, Labial Surface.

Dr. W. F. Lawrenz, St. Louis. Table Clinic—The Goslee System of Porcelain Crown- and Bridge-Work.

Dr. S. C. A. Rubey, Clinton. Non-Cohesive and Cohesive Gold Filling in Approximal Cavity.

Dr. C. D. Lukens, St. Louis. Orthodontia.

Dr. E. G. Simmons, Farmington. Method of Making Open-faced Gold Crown.

Dr. M. R. Windhorst, St. Louis. A Rapid System of Book-keeping, Modification of Card System.

Dr. A. G. Johnson, Chicago. Cleavage of Enamel preparatory to Crowning, using instruments of clinician's own design.

Dr. C. H. Williams, De Soto. Table Clinic—Rapid Method Making Perfect-fitting Open-faced Gold Crown for Bridge-Work.

Dr. D. J. McMillen, Kansas City. Extracting Roots with Elevator.

B. L. THORPE, *Corresponding Secretary,*
St. Louis, Mo.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE seventeenth annual session will be held at the Hotel Hygeia, Old Point Comfort, Va., beginning at 10 A.M., Friday, July 13, 1900, and continue in session three days.

Delegates will present certificates signed and sealed by the officers of their respective boards.

The hotel rates will be $2.50 per day.

For New York, New Jersey, and Eastern States members the Old Dominion Steamship Company, foot of Beach street, New York, will make a reduced excursion rate of twelve dollars, including state-rooms and meals, sailing 3 P.M. Monday, July 9, and Thursday, July 12.

CHAS. A. MEEKER, D.D.S., *Secretary,*
29 Fulton street, Newark, N. J.

BIENNIAL MEETING OF THE NEW BRUNSWICK AND NOVA SCOTIA DENTAL SOCIETIES.

On Wednesday, August 29, 1900, the New Brunswick and Nova Scotia Dental Societies will convene together in St. John, N. B., and continue in session for two or three days. Expert clinicians will be present and demonstrate. Papers on special subjects will be read and discussed, and it is expected a meeting of especial interest, information, and sociability will be the result. The several dental manufacturing companies and supply houses will make exhibits. All members of the profession who happen or are liable to be in the vicinity at the time will be cordially welcome to attend the session.

MAINE DENTAL SOCIETY.

The thirty-fifth annual meeting of the Maine Dental Society will be held in Brunswick, July 17, 18, 1900. All dentists are invited to attend these meetings. The Executive Committee have arranged an interesting program and hope for a large attendance. H. A. Kelley, *Secretary.*

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The next meeting of this board for examination will be held at La Crosse July 17-19, 1900, beginning at 9 A.M. All examinations are conducted in the English language, in writing. A practical demonstration is also required, and applicants must furnish their own instruments and patients.

W. H. Carson, *Secretary,*
Goldsmith Bldg., Milwaukee.

WEST VIRGINIA STATE BOARD OF DENTAL EXAMINERS.

A meeting of the West Virginia State Board of Dental Examiners will be held at Martinsburg, August 1, 2, and 3, 1900, for the examination of candidates. The examination will be in writing, and will cover all branches taught in the representative schools, together with operations in the mouth.

Candidates are requested to bring instruments, rubber dam, and gold.

Jas. R. Stathers, *Secretary,*
Sistersville, W. Va.

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EDITORIAL.

THE NATIONAL MEETINGS.

By the time this issue reaches our readers the date of the great annual dental meetings will be close at hand. The National Dental Association will convene at Old Point Comfort, Va., July 10, and continue until the 13th, inclusive; the meetings of the National Association of Dental Faculties and of the Dental Examiners immediately follow. The work of these bodies is always fraught with importance to dental professional progress; they are the reflex of that unceasing activity of thought and effort which is the motive power in our advancement. The observer who sees only the evidences of conflict of ideas, who comes away with the impression that the annual meetings are nothing more than the arenas of professional strife, does not see beneath the surface or realize that these ebullitions of human earnestness are the necessary factors of a process of adjustment and clarifying of relations which mean growth. If all believed and reasoned alike these meetings would be unnecessary, but the variety and complexity of our problems and the multiplicity of views regarding them necessitate these annual occasions in order that by interchange of sentiments and opinions the lines of advancement may be made clear.

Certain problems, like the poor, are always with us. Dental education, dental legislation, and pyorrhea alveolaris have come prominently forward for discussion at each annual meeting. So much have these topics been threshed over that their ubiquitous character has afforded opportunity for much unseemly levity as they have repeatedly been presented. It is possible that those who scoff at these familiar topics may not realize their importance, or may regard them as insoluble problems. But at no time in our history has the question of education been a more important issue in dentistry than it is to-day. The demand of the profession and the public for competency among dental practitioners has been increasingly met, until the time-limits of the present curriculum are insufficient to properly contain its educational requirements. We are asking for an additional year in order to properly train men for the practice of dentistry, and the increase of time is certain to be a required condition in the near future. When that has been accomplished we shall be confronted with the anomalous spectacle of a specialty of medical science demanding for the adequate training of its practitioners a length of time equal to that now accorded for the training of men in all of the other medical specialties combined. More than that, there has grown into the dental curriculum practically the whole group of elementary branches of medical science which are fundamental to all specialties of the healing art. Unlike its congeners, the dental specialty has had its growth under a separate educational system; its development has, as a result, been relatively more rapid, even though in the growing it may have lacked for a time the breadth of foundation which the other specialties of the healing art enjoyed. The time is close at hand, however, when a readjustment of the educational problems of medical science must take place. The time devoted to the medical curriculum is wholly inadequate to fit the graduate for the practice of more than one department of medicine, yet his degree empowers him to practice any or all of its specialties. The conviction is gaining ground that to cover the entire field of medical study would be impracticable, if not impossible for any one individual, which, if true, would seem to indicate that the M.D. degree is *de facto* a partial degree, and does not have the significance to which it was entitled when it fairly covered the whole range of medical knowledge, as in former years. What is needed, then, is to reorganize medical education in view of its present development by making certain branches which are fundamental to all departments the essential basis of elementary medical training, and superadd to this educational foundation a training in the special departments which the student elects for his professional lifework.

A reorganization of this character cannot long be avoided if one may correctly interpret the signs of the times. In such a reorganization dentistry must take its proper place with reference to the other medical specialties, for the reason that it is in fact a medical specialty, and the education required for its practitioners is now in advance of that required for those of the other specialties.

It should be borne in mind that we are now requiring that dentists shall be medically educated. This does not mean that they are required to be educated as practitioners of medicine. There is no valid reason why the dentist should be trained in many of the medical branches,—*e.g.*, gynecology, ophthalmology, diseases of the skin, etc.,—any more than the general practitioner should be trained in operative and prosthetic dentistry. The time is past when it is rational to claim that the dentist should first take a complete medical course before engaging in dental practice. The dental curriculum needs but slight alteration to furnish the graduate with all of medical science needful for the intelligent practice of the dental specialty. All education is shaping itself with reference to its power of fitting the possessor thereof to satisfactorily pursue his lifework, and the best education is that which most nearly helps to that end.

We have felt the need in dentistry for medical education, consequently the dental curriculum has included so much of training in medical science as has been found useful to its purpose; beyond which point it is useless and unsafe to go. Useless because there is much in medical science unnecessary to the successful practice of dentistry; unsafe because repeated examples are at hand showing that men who have begun their professional training in medical schools, superadding the D.D.S. to the M.D. degree, do not as a rule make the best practitioners of dentistry. Let us then address ourselves to the problem of securing the best training for dentistry by recognizing that, while a thorough training in the foundations of medical science is essential, it is not necessary that the dentist pursue the training required for the general medical practitioner. It is not a question of the professional degree, but of professional knowledge.

When the system of medical education, using the term in its broad sense to include all of its special departments, is reorganized upon a rational basis, the question of the degree or degrees by which the several specialties will be designated will logically solve itself.

It is this general view of the educational problem which we trust will be considered at the coming annual meetings, and it is with reference to this view that the problem of pyorrhea alveolaris bears a pertinent relation.

No single problem in dentistry has done so much to convince the doubting of the need for a broad culture upon the part of the dentist in the foundations of medical science. The wordy warfare which has been waged around the question of its constitutional and local relations is the outgrowth of the general need in the dental profession for a clearer appreciation of the meaning of the terms constitutional and local. No other problem of our specialty has so directly compelled the study of general pathology in connection with dental and oral lesions, and no other has aroused so generally the feeling that the dental curriculum has been inadequate to furnish the training necessary to solve this complex problem.

In proportion as men have studied the scientific basis of general pathology have they come to realize the importance of the predisposing factors in the production of the disease in question, and to arrive at a clearer understanding of the terms constitutional and local so often flippantly applied to it. We are beginning to recognize that the etiology of so-called pyorrhea is to be found in the study of its predisposing causes, as well as in a local exciting cause, and that the former, which leads us into a study of the conditions which give rise to aberrations from the normal processes of bodily nutrition, furnish an unanswerable argument for the broad medical training of the dentist. We are inclined, therefore, to assign to pyorrhea alveolaris a new *rôle,*—viz, that of an educational power in dentistry which is compelling a broadening and extension of the dental curriculum to a degree which, in the reorganization of medical education already alluded to, will place the dental specialty on a basis where the right of its practitioners to be regarded as medical men cannot be longer mistaken or ignored.

A SLUMP IN THE DIPLOMA TRAFFIC.

ILLINOIS has long possessed a vicious law under which it was possible for irresponsible men to obtain charters for colleges authorized to confer degrees. This has made Chicago the headquarters for all the degree-selling colleges of the country. The matter was first publicly ventilated in the report of the Committee on Foreign Relations of the National Association of Dental Faculties, at the annual meeting held two years ago in Omaha. This report was a scathing denunciation of the law, which it pronounced a disgrace to the state. The committee was continued by the National Association, and they were authorized to expend such sums of money as were necessary in the further prosecution of the investigation.

The report aroused a great deal of feeling among the educators of the state, and a meeting of representatives of the various degree-granting literary institutions was called and a committee was appointed, consisting of Presidents Harper, of Chicago University, Rogers, of Northwestern, and McClure, of Lake Forest, to memorialize the legislature, and to endeavor to place the educational affairs of Illinois on a better basis. The report of the Foreign Relations Committee was widely circulated. It was presented before the legislature, and extracts from it were printed in circulars and in the newspapers.

The efforts of the committee failed, but the counsel of the Foreign Relations Committee introduced another bill, which became a law, authorizing the annulling of the charters of any colleges which granted degrees improperly. The Illinois State Board of Health was already at work toward the same end, and the Foreign Relations Committee joined forces with that body. The consequence has been that the conductors of the "Independent Medical College of Chicago," which has advertised openly in the newspapers that it would furnish diplomas for a consideration, have at last been caught and brought to book. It was found when they were arrested that they were in possession of *twenty-four* different charters, so that when one was annulled they could immediately operate under another.

These men are now in jail, and it is hoped that the worst of the fraudulent colleges is broken up, and that its fate will deter others. It is believed that this institution has sold in this country and in Europe more than a thousand diplomas.

The *Chicago Tribune* of June 5 prints the following with reference to the matter:

"After four years of defiance of the State Board of Health of Illinois, the proprietors of the Metropolitan Medical College were arrested yesterday by United States Marshals on the charge of using the mails to defraud. The institution has been graduating one thousand 'physicians' a year without serious molestation because of the inadequacy of the state health laws, but the capture of the owners of the college by federal officials puts the prisoners in what they regard as a serious box.

"The arrest of the men is the result of a final effort of the State Board of Health to abolish the 'medical' college. The institution was organized in 1895 under the name of the Illinois Health University. The charter for this name was revoked by the board two years later. Immediately the college was reorganized by the same owners under the name of the Independent Medical College. A revocation of this charter in December last resulted in the college being started anew under the name of the Metropolitan Medical College. Finding that the promoters of the institution had seven charters remaining under which the institution could be conducted, Attorney John A. Barnes, counsel for the board, interested the post-office authorities in the prosecution.

"The struggle of local authorities to end this diploma fraud has been as persistent as it has been ineffectual. Meanwhile the fair fame of the city has been injured abroad, especially in England, where the 'fake' colleges have been heralded. The evil has even been the subject of discussion in Parliament."

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ANESTHETICS, THEIR USES AND ADMINISTRATION. By DUDLEY WILMOT BUXTON, M.D., B.S. Third Edition. London, H. K. Lewis; Philadelphia, P. Blakiston's Son & Co., 1900. Price, cloth, $1.50.

We strongly commended the second edition of this work when it appeared in 1892 as one of the very best books of its class, particularly because of its practical value as a sound guide for the busy practitioner who wants accurate information and clear, concise directions to direct him in the practical application of the subject of which the book treats. The present edition contains all of the valuable features of its predecessors, and much additional matter which brings it fully up to the existing state of the art and science of anesthesia. It is a work of especial value to dentists, in that it deals fully with anesthetics and anesthesia from the point of view of dental practice. If the information contained in the book were part of the educational armamentarium of every dentist, we would hear less of accidents from the use of anesthetics in dental practice.

De L'Hypothyroïdie Bénigne Chronique ou Myxœdème Fruste. Par Le Dr. E. Hertoghe a Anvers. Extrait de la Nouvelle Iconographie de la Salpêtrière. Paris, Masson et Cie, Editeurs, 1899.

Dr. Hertoghe's monograph upon chronic masked myxedema is a most interesting and instructive study of that obscure disorder. It possesses features of especial interest to the dentist by reason of the careful studies of the oral conditions which have been observed in connection with the disordered nutritional process under consideration. While the author apparently attaches considerable importance to the gingival lesions, we are unable to see from his descriptions that they present especial or characteristic features which are not found in many cases where myxedema is not present.

The successful results obtained by the author from treatment by thyroid extract are at least suggestive of the possibility of a therapeutic value for the preparation in selected cases of gingival disease of the malnutritional type, especially where a myxedematous factor may be suspected. It is gratifying to find a medical author who regards the oral tissues of sufficient importance to record their pathological manifestations in connection with his observations of the other tissue lesions of the body.

Transactions of the College of Physicians of Philadelphia. Third Series. Vol. XXI. 1899.

OBITUARY.

DR. GEORGE H. CUSHING.

Died, May 25, 1900, near Los Angeles, Cal., from uremia, George H. Cushing, M.D., D.D.S., in the seventy-second year of his age.

Dr. Cushing had been in rather precarious health for several years, repeated severe attacks of the grippe having enfeebled his naturally robust constitution. In 1898 he removed to Southern California, hoping for benefit from its balmy climate. To an extent his hopes were realized, but there was no permanent improvement, no essential progress toward strength. His final illness was of short duration. He attended to his duties as superintendent of the infirmary of the college on the morning of Monday, May 21, and was especially cheerful. In the afternoon, feeling unwell, he returned home early. The next three days he was unconscious most of the time. Friday morning he rallied apparently, but a little later he died in convulsions. The remains were cremated and forwarded to Chicago, where they were buried in Graceland Cemetery. Memorial services, largely attended by professional friends and others, were held at the chapel of the cemetery. The immediate cause of death was fatty degeneration of the heart.

George Hoppin Cushing was born May 11, 1829, in Providence, R. I., where his father was for sixty years cashier of a bank. About 1846 he began the study of dentistry with Dr. Fisher, of Providence. In 1848 he opened an office of his own at Bristol, R. I. In 1849 he went to California, and practiced dentistry for a time in San Francisco, afterward engaging in prospecting and mining. In 1856 he returned to Rhode Island, and in 1857 removed to Chicago, and engaged in the practice of dentistry, in partnership with Quinlan Brothers, then the leading dentists of the city. Some ten years later Dr. Cushing began practice on his own account, continuing till the failure of his health in 1898, when he removed to Florence, near Los Angeles, Cal.

Dr. Cushing was twice married: First, in the spring of 1858, to Miss May Larned, daughter of Major C. H. Larned, U. S. A., who died four months later. June 1, 1860, he was married to the sister of his first wife, Miss Lavinia C. Larned, who survives him, with two sons and two daughters.

In considering the life-work of Dr. Cushing, as a dentist, it is difficult to decide as to the department in which he achieved the greatest success. He enriched the armamentarium of the dentist by a number of inventions, among them improvements to the dental engine and appliances for effectualizing its work. He also devised a popular set of scalers. In the operative branch, to which his energies were mainly devoted, he stood in the front rank. His manipulative ability was of the highest order. In the filling of teeth he had few equals, no superiors. To his patients this was his highest recommendation. To his fellow-practitioners his example in this regard was always a stimulus to exert their best efforts for their patients. Doubtless to the recognition of his skill as an operator was due his early promotion to a place among the leaders of the dental profession.

In this relation he soon demonstrated that he was a thinker as well as a doer. Thoroughly loyal to his profession, believing its work a beneficence to humanity, he cherished a lofty ideal of its mission, to the achievement of which he labored without stint. He early became active in association work; was one of the founders of the Illinois State Dental Society, with the presidency of which he was twice honored; of the Chicago Dental Society and Chicago Odontological Society, of each of which he served as president. In 1865 he became a member of the American Dental Association; was made president in 1872, and secretary in 1878, and thereafter annually until the association was merged in the National Dental Association, in 1897. On the organization of the latter body he was elected secretary, an honor which was accorded to him again in 1898 and 1899. He died while holding the office under the last election.

Dr. Cushing bore a prominent part in the work of the associations with which he was connected. He believed that they should be made to yield the largest degree of honor to the profession, and he did not become a member merely to swell the list of names, but to contribute whatever he might to their success. He contributed papers, took part in the discussions, and under all circumstances what he had to say was listened to as the word of a man of sound knowledge, wide experience, ripened judgment, and conservative, well-considered views. Although not a frequent contributor to the periodical literature of dentistry, what he did write was well done. He was a man of decided convictions when once his mind was made up, with a clean-cut way of expressing himself, and a large command of language, which gave him the ability to present his argument in a convincing way.

In educational matters, Dr. Cushing took a laboring oar. When, in the early eighties, the various medical colleges of Chicago created chairs for the instruction of their students in dental subjects, Dr. Cushing was selected as the incumbent of the chair in one of the schools. When this movement culminated in the organization of the Chicago Dental Infirmary,—the forerunner of the Chicago College of Dental Surgery,—Dr. Cushing was made professor of the principles and practice of dental surgery. In 1886 the college elected him emeritus professor of the same chair. Some years later he became a member of the faculty of Northwestern University Dental School, as professor of the principles and practice of dental surgery.

In his teaching work, Dr. Cushing was eminently successful. He taught the things which he knew, and he taught them in such wise that his students knew them. He was especially apt in clinical instruction. His thorough understanding of operative work, his great skill in demonstrating the application of principles, and his ability to tell the things he knew in plain, understandable terms, bore rich fruit in the widened practical knowledge which the students gained from his lectures.

In recognition of his abilities, the Ohio College of Dental Surgery conferred on him the degree of D.D.S. in 1864, and some years later Rush Medical College similarly honored him with the degree of M.D.

When Illinois placed a law regulating the practice of dentistry on her statute books, in 1881, Dr. Cushing was promptly chosen as one of the five examiners provided for. He served two or three terms on this board, always with satisfaction to those whose interests he was there to safeguard.

After his retirement to Southern California, the authorities of the College of Dentistry of the University of Southern California elected him to the presidency of the directors of the dental department, and called him to the chair of clinical operative dentistry. He was also superintendent of the infirmary. Here he did the same excellent work that had always been characteristic. He enjoyed the opportunity for usefulness, and the students here as elsewhere appreciated and respected him highly.

As a man, Dr. Cushing was straightforward and honest, not given to befogging what he believed was right with questions of expediency; a strong man, firm in his convictions, he would rather go down fighting for the right than compromise with the wrong. If a measure was right, all men should unite in supporting it. A warm-hearted man, always helpful, he endeared himself to a wide circle of friends. One who knew him long and well wrote, a few days since: "I doubt if there was ever another man in the profession who had a warmer place in the hearts of all who knew him. If I were to describe in a word the leading trait of his character which made him so valuable to the profession, it would be his entire unwavering faithfulness to duties he assumed. One of the organizers of the Illinois State Dental Society, he did not miss a meeting for thirty-three years, nor did he ever fail, I think, to be present at roll-call or adjournment. It is doubtful if another such record could be found in the dental profession."

To this may be added his long and faithful service as secretary of the American Dental Association and its successor. Few of the members will ever know how much their Transactions owed to his arduous work as editor. He was an ideal secretary. Scrupulously exact in his notation of the minutes, he had an intimate knowledge of parliamentary procedures, and he had the editorial faculty in a marked degree. His work on the Transactions was a model for others to follow.

The Chicago Dental Society adopted the following resolutions upon the death of Dr. Cushing:

"It has come to the notice of this society that our beloved brother and fellow-practitioner, George H. Cushing, one of the founders of this society, departed this life May 25, 1900, at Los Angeles, Cal.; therefore be it

"*Resolved*, That we mourn his loss as personal, because every member of the society knew him and loved him as a friend, counsellor, and guide. This is no ordinary expression from a committee appointed to draw a memorial, but one where every member feels that it is a personal loss to no longer see and feel the presence of one much beloved. Be it further

"*Resolved*, That in Dr. Cushing we mourn the loss of one who was in every sense an inspiration to do one's best in all the complex hours of life's duties; he was monitor, teacher, and helper in all emergencies. His life was devoted to his profession in a sense little understood by the thoughtless, and his influence for good was far-reaching and always to be relied upon.

"We feel that in this feeble tribute to the vast labors he performed for forty years we fall short in our estimation of them, because no one was more staunch in his devotion to private or public duties than our departed friend. He had his faults, but they were so obscured by his noble and gentle nature that few knew of them, so they must be in an oblivion so perfect that only his most bitter enemy may recall them. For us he was the pattern of the kindly professional gentleman and devoted friend.

"We extend to his family our condolence and the expression of our sorrow. We will all go to his last resting place feeling that life is only a brief day, and we will soon meet him again in the near future where all is peace and serenity.

"*Resolved*, That a copy of this tribute be sent to the family of the deceased, and to the dental journals for publication.

(Signed)
"A. W. HARLAN,
"TRUMAN W. BROPHY,
"J. W. WASSALL."

The following resolutions, by the students of the classes of 1900, 1901, and 1902, of the College of Dentistry, University of Southern California, were passed at a special meeting held for the purpose at Los Angeles, Cal., May 29, 1900:

"WHEREAS, In the death, after a short illness, of Professor George H. Cushing, M.D., D.D.S., which occurred at his home, in Ivanhoe, on the morning of the 25th inst., the College of Dentistry, University of Southern California, has lost one of its leading members, who during the past session served as professor of clinical operative dentistry;

"*Resolved*, That in the death of Professor Cushing the students of this institution have sustained the loss of one who has been most efficient and faithful to his duties, giving a great deal of time to us in the proper instruction in his branch.

"*Resolved*, That as an instructor he displayed wisdom and discretion, and wonderful tact in dealing with all with whom he came in contact;

"*Resolved*, That in him we found the greatest kindliness of nature and generosity of heart, which will always be remembered by us with the warmest affection.

"*Resolved*, That we extend our sincere and heartfelt sympathy to his bereaved family, in this their great affliction.

"*Resolved*, That these resolutions be entered on our records, and a copy sent to the family of the deceased, and to the several dental journals for publication.

"H. C. GLEASON, *President*,
"E. P. HILLIKER, *Secretary*,
"Class 1900.
"CHAS. E. RICE, *President*,
"M. EDNA OSBORNE, *Secretary*,
"Class 1901.
"J. W. GRAY, *President*,
"GEO. A. COMTE, *Secretary*,
"Class 1902."

The work of such a man is apt to live after him in the influence for good which it spread. All over the land are many who will mourn his death. He had passed the allotted threescore and ten, the feebleness of age was upon him, but his death is none the less a sad loss to them. They have nothing now but the memory of pleasant hours spent with him, of the strong, sturdy character, of the helpfulness of the man who has gone.

F. L. H.

DR. THEODORE MENGES.

Theodore Menges, B.S., A.M., D.D.S., died in Chicago, June 1, 1900, after a brief illness, following an operation for appendicitis.

He was born near Bristol, Ind., May 2, 1854. His early education was obtained at the country school, in which he attained such proficiency that at the age of sixteen he became a teacher where he had previously been a student, and held the position for five years. During that time, by spending part of his summers at the Northern Indiana Normal School, he earned the B.S. degree, and afterward the degree of A.M. He then took charge of a larger school at Bloomfield, Ind., and later organized a normal school at the same place.

In 1879 he was married to Miss Alice Brown, one of the teachers in his school. His educational work in Bloomfield covered a period of seven years, during the latter part of which time he took up the study of law, was admitted to the bar, and entered upon legal practice at Bloomfield. Previous to this he had taken one course in medicine at the Medical College at Louisville, Ky. After practicing law at Bloomfield for two years he removed to Kimball, Neb., and later to Cheyenne, Wyo., where he continued the practice of law, and at the same time engaged in real estate and mining speculations, for which he developed a taste and much ability, amassing in a few years what seemed to be a large fortune, but the subsidence of the boom in western land values and mining property so greatly reduced his accumulations that his financial failure seemed inevitable. However, by skillful management he saved something from the wreck, and, after closing up his business affairs, went to Chicago in 1891. Here both Dr. Menges and his wife entered the American College of Dental Surgery, from which each received the degree of Doctor of Dental Surgery in due course. His connection with the dental school developed a taste for dental educational work, and upon his graduation he assumed the supervision of the school as its secretary. The institution increased rapidly, as the result of the wise policy of his administration, due to his experience in educational work and his untiring energy. When the American College of Dental Surgery was consolidated with the Northwestern University Dental School, in 1896, Dr. Menges was retained by the University as its representative. The school prospered, and became rapidly the largest in numbers of its students in the world, and one among the best. His efforts directed toward the improvement of the material equipment of the school and its management were characterized not only by high-class results, but especially for the wisdom and sound judgment displayed in their execution. He built up for the institution a library, museum, and reading-room, which probably stand first in these particulars among dental institutions.

Dr. Menges has made an impression upon the professional development of dentistry, the extent of which it would be difficult to estimate at this time.

He was a close student of the forces which make for professional advancement in dentistry. To that end he associated himself with a number of the more active dental societies and with the national organizations which are working in the lines in which his greatest interest lay.

As chairman of the Executive Committee of the National Association of Dental Faculties, he took an active and aggressive part in the constant endeavor to improve the educational conditions in dentistry in this country. His policy as an educator was a far-reaching one, and based upon sound judgment and correct motives. His nature was too large to be warped or controlled by selfish interests. If he had any personal ambitions, they were subordinate to his desire to elevate the standards of his profession.

No one who had the opportunity to know Dr. Menges intimately could doubt that his work was carried on with a broad altruistic purpose, and not confined to the promotion of the interests of the institution with which he was personally connected. He gave of his time, energy, and private means to the promotion of the cause of higher and better dental education, and his untimely death will be regarded by all who knew him as an almost irreparable loss to the cause for which he labored. His earnestness was one of his strongest characteristics, which, combined with his experience, his judgment, and his indefatigable energy, made him a recognized power in the cause of higher education, while these characteristics served him freely as powerful means for the attainment of his ends.

He was a sympathetic listener, grateful for suggestions, and at all times willing to alter or amend his views whenever it was shown to him that he was in error. His earnestness was not the expression of dogmatism, but rather of a high ambition energetically pursued.

Personally, especially to those who enjoyed his intimate friendship, he was kindly and generously helpful in his attitude.

The cutting short of so active a career comes with a shock to all who bore relationship to it, and while we cannot question that the noble work which he was doing will go on until the ends for which he was striving are achieved, the means by which it is to be continued are not evident when we are compelled to contemplate the loss of their most prominent champion.

Dr. Menges left no family except his wife, who has been constantly associated with him in his work, and who has developed an interest and zeal closely akin to his own.

We are indebted to his colleague, Professor G. V. Black, for the biographical data embodied in the foregoing notice.

The following resolutions were adopted by the students of Northwestern University Dental School:

"WHEREAS, God in His infinite wisdom has removed from our midst, and from the work in which he was becoming so great a force, our friend and teacher, Dr. Theodore Menges; and

"WHEREAS, We, the students of Northwestern University Dental School, realizing the great loss that is sustained thereby, be it

"*Resolved,* That we bow in humble submission to the will of Almighty God, and hereby express our heartfelt sympathy to the bereaved wife and sorrowing friends, and to the faculty of Northwestern University Dental School, of which he was a valued and honored member; and be it

"*Resolved,* That each one having lost a personal friend, we express our appreciation of his untiring efforts and devotion to the upbuilding of the dental profession at large, to the Northwestern University Dental School, and to the individual interests of its students; and be it further

"*Resolved,* That a copy of these resolutions be presented to Mrs. Alice

Menges, to the faculty of said institution, and that copies be sent to the leading dental journals for publication.

"ELMORE T. HULL,
"WM. A. KAAKE,
"L. J. SCHNEIDER,
"EUGENE MAGINNIS, *Committee.*"

DR. W. W. BRIDGE.

DIED, January 15, 1900, at Providence, R. I., from appendicitis, WILBUR WINFIELD BRIDGE, D.D.S., in his forty-eighth year.

Wilbur Winfield Bridge was born at Rockville, Conn., February 28, 1852, and was educated at Wilbraham Academy. In 1870 began his dental pupilage, this being passed with Dr. William H. Loomis, of Rockville. Afterward entering Philadelphia Dental College, he was graduated from that institution in 1874. The same year he entered on dental practice at Providence, R. I., where his intelligent work made him eminently successful and where he remained in continuous professional practice for twenty-six years. After a few years his brother, Dr. Geo. A. Bridge, became his associate.

Having been prostrated by a congestive chill accompanied with appendicitis, from which affection he had been a sufferer on a previous occasion, Dr. Bridge and his family were advised by the physicians that probably his only chance of life lay in immediate operation. This measure, unhappily, although undertaken with all possible facilities and with the best surroundings, failed to avert the fatal issue.

Particularly amiable in disposition, Dr. Bridge was a man whose companionship was highly valued by those privileged to know him. His active mind exercised itself in many directions. Among other things that might be mentioned, he was an enthusiastic amateur photographer, and he had a bent to the working out of novel mechanical ideas. He was a member of various Masonic and other fraternal associations.

Dr. Bridge married, June 14, 1876, Eva S. Wattson, of Philadelphia, who, with a son, named after his father, survives.

DR. URIAL KING MAYO.

DIED, March 9, 1900, at his home, Boston, Mass., Dr. URIAL KING MAYO, in his eighty-fourth year.

Dr. Mayo held the remarkable record of having been in professional harness for a period of sixty years. Born in East Brewster, Mass., April 30, 1816, he left home when sixteen years of age, trudging it to Boston to seek his fortune. None of the various lines of business in which during the first few years he engaged proved permanently congenial, but in 1840, having found his true affinity, professionally speaking, he started in the line in which for the remaining fifty-nine years of his life he was well content to be. His location was Boston, and here, in 1844, he married Miss Eliza D. Brackett. The mechanical skill which soon characterized his work found special recognition, during the '50's, in diplomas and medals from various societies.

Of Dr. Mayo's family there are four survivors, including Frederick M. Mayo, D.M.D., of Boston.

DR. ANDREW H. TAYLOR.

DIED, February 28, 1900, at Washington, D. C., from fatty degeneration of the heart, Dr. ANDREW H. TAYLOR, in his seventy-fifth year.

Dr. Taylor was born in Luthersburg, Clearfield county, Pa., December 16, 1826. In 1856 he placed himself under Dr. Cherry, of Altoona, Pa., for instruction in dentistry. He made good progress, and acquired eminent skill in mechanical work. His pursuit of dentistry was interrupted by the occurrence of the Civil War, during which period he was in railroad service, and in 1865 had charge of the train which brought General McClellan to Aquia Creek. Having returned to dental pursuits, he set up in independent practice at Washington in 1870, and here, as the years passed, he became very successful in attracting an extensive and excellent *clientèle,* and thereby reaping a considerable pecuniary reward for his labors.

Dr. Taylor married, in 1852, at New Washington, Pa., Miss Mary Catharine Feath. Of the children born to them four survive, three sons, two of whom are in the Government service and one resides at Baltimore, and one daughter, Mrs. S. V. Reeve, with whom the father lived, at Washington, D. C.

DR. EDWARD E. CLARK.

DIED, February 25, 1900, at Milton, Pa., from typhoid fever, EDWARD EVERETT Clark, D.D.S., in his thirty-second year.

Dr. Clark, whose fatal illness was of only one week's duration, was born at Schaghticoke, Rensselaer county, N. Y., November 28, 1869. His proclivity to dentistry was fostered by a pupilage passed with his uncle, Dr. H. J. Fisk, at Hartford, Conn. Later he attended the Pennsylvania College of Dental Surgery, from which he was graduated in 1894. He was a member of the Pennsylvania State Dental Society.

Dr. Clark married, October 25, 1894, at Milton, Miss Annie W. Batdorf, who survives him.

DR. JNO. T. STETSON.

DIED, March 12, 1900, at Everett, Mass., from nephritis, JNO. T. STETSON, in his sixty-third year.

Dr. Stetson was born in Lincolnville, Me., in 1838. When come to man's estate he went to Boston, where he began preparing for his future profession by a pupilage in the office of the late Dr. Miller; he afterward further qualified himself for practice by attending Harvard Medical School.

His practice was from the first located in Boston; afterward he opened additional offices in Franklin and Concord. Although he spent his time largely in Boston, his home had been in Franklin for the past thirty years. He took a laudable interest in municipal as well as in state and national politics. He was known as a skillful professional worker, and he was an early and consistent advocate of the practicability and value of crown- and bridge-work. His personal character, by its very modesty and simplicity, endeared him to a large circle of friends. A great lover of nature and an accomplished sportsman, he was prominently identified with the Megantic Club, the Massachusetts Fish and Game Protective Association, and similar organizations.

Dr. Stetson married a sister of the wife of Governor Robinson. She died about twenty years ago. The couple had no children. His aged mother, residing at Seattle, Wash., and also four brothers and a sister, survive him.

DR. HARRISON C. STICKER.

DIED, February 28, 1900, at his home, Milton, Pa., Dr. HARRISON C. STICKER, in his sixty-second year.

Dr. Sticker was born in Reading, Pa., in 1838. His parents shortly afterward removed to Milton, and here his entire life, practically speaking, was spent. After attending the public schools and subsequently the academy in Milton, he entered on his pupilage in dentistry with Dr. Eveland, later spending some time in Philadelphia and New York and further fitting himself for his future work. Returning to Milton he established a practice in which he continued uninterruptedly engaged for forty years.

The esteem in which he was held by his professional brethren is shown by the fact that he was three times elected president of the Susquehanna Dental Society. His active interest in civic affairs led to his being called to fill the office of mayor for three successive terms. While he held pronounced views, his advocacy of them was free from animosity. He had an attractive personality, and was famous for his brilliant conversational powers and his rich fund of anecdote.

His sons, Lake E. and Carroll Sticker, chose their father's profession; the former became his father's business associate, and, constant companions in life, they were not divided in death, for the son was called away within only a brief period after the father (see notice below). The surviving members of the family are the widow and mother, Dr. Carroll Sticker, of Philadelphia, and two daughters, Mrs. W. M. Boggs, of Philadelphia, and Miss Laura Sticker, of Milton.

DR. LAKE E. STICKER.

DIED, April 7, 1900, at his home in Milton, Pa., from hepatic abscess, LAKE E. STICKER, D.D.S., in his twenty-eighth year.

It is peculiarly painful to record the cutting off in his prime, and so soon after his father's death, of this estimable son of the veteran dentist, Dr. Harrison C. Sticker, the subject of the preceding obituary notice. Lake E. Sticker was a genial, large-hearted young man, and one of the best-beloved men of his community. He received his early education at the Milton High School, upon being graduated from which he became the pupil in dentistry of his father, and later, in 1895, he was graduated from the Pennsylvania College of Dental Surgery. He afterward joined his father in the practice of his profession.

He was identified with the Presbyterian Church, and with the Milton Y. M. C. A. He was also a member of the Sons of Veterans, of the I. O. O. F., and of the Royal Arcanum.

A local newspaper fitly says, "He possessed a sunny disposition, and always had the courage of his convictions. Death could not have chosen a victim whose taking away would have been more universally regretted. To his loving and devoted mother and his sorrowing brother and sister, whose heads were bowed in grief by the death of the husband and father only a few weeks since, goes out the deepest sympathy of our people."

DR. WILLIAM T. ARRINGTON.

DIED, April 26, 1900, at Memphis, Tenn., from typhoid fever, WM. T. ARRINGTON, D.D.S., in his sixty-fourth year.

Dr. Arrington was a native of West Tennessee, having been born at Dresden, November 11, 1836. After having passed his youth on a farm in that neighborhood, on arriving at young manhood he became a clerk in a drug business in Dresden, and during the two years in which he was so engaged he employed his spare time in reading medicine, having formed the design of adopting the healing art as a profession. In 1853 he left Dresden for Hickman, Ky., but here his health gave way, and he removed to Louisiana. After residing there for a year he joined his brother, Dr. B. F. Arrington, in Goldsboro, N. C., in order to resume the study of medicine under the tutorship of the latter. At Goldsboro he also gave some attention to dentistry, eventually determining to abandon medicine for it. In 1854 he entered the Philadelphia College of Dental Surgery, and was graduated from that institution in 1856.

At Trenton, Tenn., where he began professional practice, he built up during the next few years an excellent practice. When the war broke out he joined the Confederate troops at Union City, and here he served in connection with the quartermaster's department until the evacuation of the city in 1862. His health once more failing, however, he returned to his old home and to farming life at Dresden. Shortly after the close of the war he resumed the practice of his profession, choosing Memphis as the scene of his labors. Here he built up a large practice, and became a prominent figure. He was one of the organizers of the Southern Dental Association, and was elected its first president in 1869. He took great interest in local politics, and was a man of decided views. From 1876 to 1882 he served in the school board. He was connected with several benevolent orders.

Dr. Arrington married, January 18, 1859, Miss Emma C. Levy, of Trenton, Tenn. His wife survives him, with their two children, Wm. T. Arrington, D.D.S., and Guy Arrington, both well-known citizens of Memphis.

HINTS, QUERIES, AND COMMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Since writing you in reference to the law of Paraguay regulating the practice of the professions, said law has been promulgated, and an article contained therein relating to dentists has obliged me to correspond with the Medical Board here, asking from them certain explanations; and as their decision may in future affect the standing of United States graduates not only in this republic but throughout South America as establishing a precedent, I herewith append translation of the correspondence.

ASUNCION, March 18, 1900. EBEN M. FLAGG.

"ASUNCION, PARAGUAY, January 29, 1900.

"DR. HECTOR VELASQUEZ, President of the Medical Board, Asuncion.

"*Dear Doctor,*—In the new law regulating the practice of the professions in Paraguay, I read the following:

"'ARTICLE 40. Dentists can only render the services of their art, not being allowed to practice anesthesia by chloroform or ether without the intervention and presence of a physician,' etc.

"I wish to know if this prohibition can be applied to those dentists who have the title of doctor legally ratified and registered in the Republic of Paraguay.

"It is now fifteen years since I presented my diploma as Doctor of Dental Surgery of the New York College to be ratified here, expecting thereby to obtain in Paraguay the same rights that the diploma endowed me with in my own country.

"The practice of anesthesia by chloroform or other anesthetics is an important branch of dentistry, and the scientific world knows that anesthesia was the discovery of a North American dentist (Dr. Horace Wells).

"During the past twelve years I have practiced anesthesia for every sort of operation, and often at the invitation and request of physicians here and in Uruguay. To deprive me of that right now would be to have my diploma but half ratified.

"Article 32, of the Paraguayan Constitution, declares positively that 'No law shall have a retroactive effect.' Yet, to deprive a person of acquired rights is the very essence of retroactive laws. Therefore, I wish to know if the prohibition contained in Article 40 of the present law can apply to those dentists who have the title of doctor legally registered in the Republic of Paraguay.

"Improving this opportunity of expressing to you my sentiments of the highest consideration, and awaiting your reply, I remain

"Your obedient servant,

"Eben Moore Flagg, D.D.S., etc."

"National Board of Health,
"Asuncion, February 28, 1900.

"Dr. Eben Flagg.

"I transcribe for you that part of the minutes of the meeting of the sixth of the present month which relates to your note, and which is as follows:

" 'There was read a letter from the dental surgeon, Dr. Eben Flagg, in which he shows that in the new law relating to the professions there is an article which says that dentists cannot practice anesthesia by chloroform or ether without the intervention of a physician, and therefore he desires to know if said prohibition is applicable to those dentists who have the title of doctor legally ratified and registered in this country.

" 'In respect to this it was resolved that *Doctors of Dental Surgery are of equal standing with those physicians who are specialists.*'

"This is a faithful copy. E. Marengo."

To the Editor of the Dental Cosmos:

Sir,—In your list of officers of the Mississippi Dental Association, published in the June Dental Cosmos, there is a mistake in the secretaryship. Instead of Dr. A. B. Kelly, of Yazoo City, it is

Yours respectfully,

Dr. W. O. Talbot, Biloxi, Miss.

[The list referred to was taken from a local newspaper report of the meeting.—Ed. Dental Cosmo's.]

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MAY, 1900.

May *1.*—No. 32,617, to Clare S. Bradley. Design for dental crown-driver.
" *8.*—No. 649,234, to Angelo Chiavaro. Dental tool-holder.
" " —No. 649,336, to Jesse W. McConnell. Dental chair.
" *15.*—No. 649,424, to Aaron E. Adams. Manufacture of tooth-crowns.
" " —No. 649,624, to Friedrich A. Wienand. Manufacture of artificial teeth.
" " —No. 649,642, to Roscoe F. Ludwig. Hand-piece coupling.
" " —No. 649,717, to Arthur W. Browne. Gas administering apparatus.
" " —No. 649,742, to Benj. B. Mories. Dental forceps.
" " —No. 649,854, to John A. W. Lundborg. Dentists' mouth-dilator.
" " —No. 649,512, to Wesley R. Goodwin. Sterilizing cabinet.
" *22.*—No. 650,042, to Abraham L. Gilmer. Dental chair.
" " —No. 650,088, to Alfred D. Hoag. Dental instrument.
" " —No. 650,153, to Charles McLear. Dental tray.
" " —No. 650,260, to Charles F. C. Mehlig. Dental trimmer.
" " —No. 650,350, to Louis A. Block. Dental impression tray.
" " —No. 32,715, to Wm. E. Harper. Design for dental cabinet.
" *29.*—No. 650,400, to George F. Krieger. Crown-swaging device.
" " —No. 650,467, to George F. Krieger. Device for making cap-crowns.
" " —No. 650,464, to Louis F. Hough. Dental bite-plate.
" " —No. 650,685, to Norman S. Lea. Tooth-crown stamping machine.

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ORIGINAL COMMUNICATIONS.

A FEW REMARKS ON CRENOTHRIX AND CLADOTHRIX FORMS IN THE MOUTH, ACCORDING TO MR. KENNETH W. GOADBY, OF GUY'S HOSPITAL, LONDON.

BY F. VICENTINI, M.D., CHIETI, ITALY.

IN the March and April numbers of the DENTAL COSMOS Mr. Goadby, of London, communicated some interesting researches on "micro-organisms in dental caries," dealing with various forms of bacteria and bacilli, and I shall limit my present observations to only two points of his paper,—viz, to Leptothrix racemosa, which he believes may belong to the genus Crenothrix, and to the club shaped threads which he positively refers to the genus Cladothrix.

As to the first subject, I do not contend that the name Leptothrix racemosa, given by me to the new organism and now accepted among some observers, was adopted provisionally; nay, I repeatedly emphasized the hope of a better definition by other observers more learned in the study of mycetology and algology (see the end of my work on this subject and my late paper in the DENTAL COSMOS, March, 1900, p. 223), but I must observe that the definition of the same organism, as a Crenothrix form, advanced by Mr. Goadby seems to me a very improbable one.

"This organism," says the author in account of the Racemosa, "much more resembles Crenothrix of Rabenhörst than anything else" (see his above paper, p. 209, and elsewhere). "The fruitful heads and other phenomena of Vicentini's Leptothrix racemosa, as observed by myself in the cover-slip plates, agree in many respects with the Crenothrix Kühniana of Rabenhörst" (*ibid.*, p. 320).

Now, this statement might be prejudged at a first glance by a simple consideration,—viz, that the same classification of the Leptothrix, Cladothrix, and Crenothrix genera is truly no less provisional, doubtful, and uncertain in character than the definition of the new organism we are dealing with. The same Dr. Geo. Winter, the author of the section "Pilze" in Rabenhörst's work ("Kryptogamen Flora," etc., second edition, Leipzig, 1884), states that "the value of Leptothrix species is a very doubtful one" (p. 56), and that "Cladothrix and Streptothrix are both very doubtful genera" (p. 59). In his "Algen Sachsen," No. 284, Rabenhörst himself classified Crenothrix Kühniana under the name of Leptothrix Kühniana.

Again: While Mr. Goadby claims to place the new organism under the genus Crenothrix, I recall that Professor Miller was, in his turn, inclined to refer it at first to the genus Cladothrix. When he sent me the photo-micrograph of racemosa, magnified to 400 degrees (see Fig. 31 of my work), there was at the bottom the following explanation: "*Schmelzoberhautchen mit Cladothrixartigen Wucherungen* (micro-organisms from the enamel cuticle)," which, after some remarks on my part, he consented I could change in the denomination of "Leptothrixartigen wucherungen," as was printed at page 232 of the above work.

But, whatever may be the genus to which we may refer the new organism, by my studies of the species of each I have come to the conclusion that our racemosa constitutes a new and before unknown species, whether of Leptothrix or of Crenothrix.

As Mr. Goadby refers us to Rabenhörst's work, we may find there for the genus Leptothrix the species Leptothrix buccalis, Robin, 0.7 to 1 μ broad (p. 56); Leptothrix parasitica, Kützing, of which I spoke also in my work (pp. 158, 161, 162, 176, and Figs. 17, 18, 21, 22); Leptothrix pusilla, Rabenhörst, and Leptothrix lanugo *(ibid.)*; to which we may add Leptothrix buccalis maxima, Miller ("Micro-organisms of the Human Mouth," American edition, Philadelphia, 1895, p. 73), "the largest occurring in the mouth, 1 to 1.3 μ broad," when its identity with the *low stumps* of the same Leptothrix racemosa (as in the synopsis given by me at p. 99 of the work) will be refused, as well as Leptothrix gigantea, Miller (*Berichte der Deutsch. Botan. Gesellsch.*, 1883). Other species of Leptothrix, green-colored, were by Rabenhörst referred to the Algæ.

The genus Cladothrix embraces, according to Winter, two species alone,—viz, Cladothrix dichotoma, Cohn, 0.3 μ broad, and Streptothrix Forsteri, 2.5 μ broad (*ibid.*, pp. 59, 60).

The genus Crenothrix is represented by the only species, Crenothrix Kühniana, 1 to 5 μ broad (*ibid.*, p. 67), to which Winter refers also Crenothrix polyspora, Cohn.

The drawings of Cladothrix dichotoma and Crenothrix Kühniana are given by him at pages 40 and 42. A drawing of Crenothrix polyspora can be seen in Tiemann-Gaertner and other authors.

I will not repeat here Winter's description of these genera and species, neither those of the authors just mentioned, which would carry us too far; but everybody is in position to see that neither the same descriptions nor the alleged drawings could agree in any respect with our racemosa. In none of them, in fact, can we find any hint whatever of a kind of outside sporulation and sterigmata, —*i.e.*, true and proper fructification, like that of our racemosa, if my observations, with those of Williams and Fort, are exact.

Mr. Goadby was not clear and explicit enough on this point. He speaks of spore-like bodies in racemosa, and differentiates them from the adventitious cocci, which at times would, according to him, exert some erosive action upon the threads (DENTAL COSMOS, *loc. cit.* p. 208) ; but we cannot properly understand what he means by spore-like bodies. It seems that he admits only a formation of spores around the threads, but not their attachment to the latter by means of true peduncles. I hope that Mr. Goadby, in a further work announced at the end of the paper, will clear up this point, as it seems to me the most important.

That "the small transverse sections of J. Leon Williams seem to be small zooglea masses," as stated by the author (p. 320), may be contradicted by the fact that they are implanted *around a stalk,* which is not the case in the zooglea masses described by Winter, and compared by him to Palmellina flocculosa, Radlkofer (see, at p. 42 of his work, the drawing of Crenothrix Kühniana, 6). Figs. 23 and 25 of my work give, I think, the most decisive evidences of this fact, chiefly in the Italian edition, where the plates were drawn more nicely. In Fig. 23, *d,* a fragment of a stalk stained with iodin solution shows its peduncles without spores, excepting two spores still adhering (p. 171 of the text). In Fig. 25 an apical *rosette* of six peduncles, with their spores (p. 172 of the text), appears at the top of an *ear* stained with the same solution. The single cell bodies of the zooglea in question are, besides, without comparison more bulky and with nuclei in their inside. As for the rest, I leave to Dr. Williams, at his pleasure, to debate this point more particularly.

As to the examination in hanging-drops undertaken by Mr. Goadby, we may entertain some doubt whether by such an arrangement and through such artificial culture-media the proper conditions of a true *aerial* vegetation and fructification of the same organism are provided (as spoken of at pp. 87, 88 of my work and elsewhere). The fruitful threads noticed there by Mr. Goadby may, in my opinion, have been at first so many *ears* already preexistent in the mouth, while the others, growing on the cover-slips in the second place, may have been nothing but incomplete and spurious ones.

It may be questioned, moreover, whether upon such hanging-drop specimens the highest powers which are required for detecting the peduncles can be satisfactorily applied without breaking the cover, because the working distance of the object-glass could not always approach the focus. On the other hand, the considerable thickness of the preparation cannot protect us against the opacity, owing to the stained vehicle and chiefly to the numberless bacteria and cocci or other particles floating there on several and superposed planes; so that the distinct view of the objects may be more or less impaired, and the properly called *critical image* of such delicate and minute features will often be an unattainable result.

On the question here concerned, the detection of the peduncles, I do not wish to be charged with contradiction between the present remarks and those advanced by me in the previous article. The search for the peduncles requires, in fact, so adequate a power and such improved illumination method (see pp. 222, 223 of my work) that the actual view of the peduncles is very difficult. In this sense, and in opposition to the comparative ease of attainment of this object claimed by Dr. Williams, I recalled in the previous article the unsuccessful efforts of Professor Miller, of Mr. Mummery, and Mr. Goadby in detecting the peduncles. But this negative fact is no ground for denying the positive fact of the existence of the said peduncles, as first described by me and recently confirmed by Dr. Williams and Dr. Fort.

Hence, I repeat, the botanical question put by Mr. Goadby will be reduced to a more simple one,—*i.e.*, to ascertain if the organism described by me (whether it may be referred to the genus Leptothrix or to the genus Crenothrix), with the characteristics given by me and largely confirmed by Dr. Williams, must be qualified as a *known* species or a new and before *unknown* one.

"But," asks the author, "what constitutes a new organism?" And replies, "Certainly not the morphological differences alone, as so many observers have relied upon (Miller, Vicentini, etc.). No, a new organism must present some points in its biological, pathological, biochemical, as well as its morphological conditions, by which it may be recognized and in virtue of which it differs from other known organisms" (p. 202).

I respectfully observe that the question so stated implies a change of terms. We, in fact, are dealing here not with the obvious bacterial elements as such, but with a more complex organism; nay, we are confronted with its *fructification form,—i.e.*, with the most important and decisive characteristic of any well-defined cryptogamic species. Let me on this point recall here what I already said at pages 190, 191 of my work: "In the second memoir I have already referred to the insufficiency of peculiar vital action as forming a basis for the classification of the bacterial species. The distinct characteristic of the other cryptogamic species (I said) is to be found in the fructification of the completed series of the various morphological phases of each. No one would pretend to classify an *alga* and a *fungus* from observation based upon experiments of the vital action of their single elements on their hosts. But, departing from the ordinary rule, if we wish to assume such a distinctive criterion for the classification of certain species of bacteria simply because their natural history is at the present to a great extent unknown, it does not follow that the same should be entirely overlooked."

Hence it appears that the divergence between Mr. Goadby and myself may be reduced to the fact that he would confine the study of this "interesting organism," as he calls it (p. 209), within the laboratory walls, while I would invite to it the attention also of all the botanists and medical men working with the microscope. And this for the reason that the life history of bacteria in general, and of the new organism in particular, cannot, in my opinion, be understood by the culture methods alone, as I touched upon on various occasions, but rather by the aid of a morphological and careful study of the genuine growths of the mouth. Dr. Williams worked about a year at the control of the fructification forms, but further work should be done to clear up the other facts and the various problems that arise from them. Hence I think that to persist in dealing exclusively with the scattered bacterial elements of the mouth is much like searching for the center of a circle by running over its circumference.

"The study of the life history and pleomorphism of the bacteria in the human organism," says Dr. Williams, "has, I shall venture to say, been too much neglected. The reason for this may perhaps be partly found in the inherent difficulties of the problem, and also in the pleasure and prestige which the investigator finds in the cataloguing of so-called new species. And although it has from time to time been suggested by those who have studied this subject from the point of view of the botanist and the biologist that the many forms of bacteria known may in many instances represent but passing or accidental phases in the life history of some organism, although they have pointed out that many fungi whose life history has been completely followed out have supplied evidence that the parent organisms are comparatively few, still the cataloguing of species has progressed until there are now, I believe, not far from a thousand species registered" (DENTAL COSMOS, 1899, pp. 330, 331).

Coming now to the other specimens noticed by Mr. Goadby in the mouth (Fig. 21 of his paper), and called by him Cladothrix buccalis, I believe that they do not differ substantially from the similar forms already described by me since 1890, under the name of swellings at the apex or small heads of young filaments (see p. 116 and Fig. 9, *b*, *c*, of my work). I found them also round some small flakes or spires of the mucus of the male urethra, and "so closely similar to the young clods of the *patina dentaria* that the most experienced investigator would be unable to distinguish one from another" (*ibid.*, p. 134).

Could I have foreseen that another observer, ten years after, should have assumed this form as an independent species (Cladothrix buccalis), I would have given of it a larger description in the text, with more elaborate illustration. But I do not pretend to solve here the question whether the threads alluded to by Mr. Goadby belong to the racemosa itself, in its younger condition, or to a species of Cladothrix; that will be matter for further inquiry. I will only note that this form is comparatively scanty in the mouth, and in respect to this nobody could compare it to our racemosa, any more than in the ancient times a gardener could have compared his small barn-floors to the Hercynian forest.

Like the other critics, Mr. Goadby has not forgotten, in his turn, to rebuke me for claiming the racemosa as the source of *all* bacteria and bacilli found in the sputa. But I have already cleared up this point, so that it will suffice to repeat here that, in my opinion, the mouth bacteria, not *all,* but *a great many,* may be simple appurtenances of our racemosa.

For the better understanding I will, nevertheless, recall the capital fact I have just pointed out, and which Mr. Goadby seems to have thoroughly overlooked,—*i.e.,* the striking *profusion* and *persistence* of racemosa upon our teeth, so properly emphasized by Dr. Williams. "Leptothrix racemosa," he says, "is common to all mouths which I have examined. The forms which must result from the breaking up of the spore-heads and stems of this micro-organism are long and short rods, various sizes of micrococci, various sizes of diplococci, and various sizes of curved and club-shaped bacilli. I have no disposition to indulge in speculation over these discoveries, but here are the facts which must be reckoned with in all future considerations of the bacteria of the human mouth and body. It would be folly to deny that these facts are big with possibilities. After the most thorough cleansing of my own mouth by the aid of tooth-brush, pick, silk floss, and powerful germicides I have, after forty-eight hours, found the fructification heads of Leptothrix racemosa growing luxuriantly. They must therefore develop with considerable rapidity. However much we may be disposed to reticence, it is impossible to avoid asking what becomes of the enormous number of micro-organisms of different forms and sizes which are being constantly shed into the mouth by this parent organism, and how many of them have been classified as permanent species. It now becomes perfectly plain why such a large number of different forms are found in the microbic plaques which Dr. Truman supposed to be chiefly or entirely composed of Leptothrix buccalis. A large majority of these forms are undoubtedly the product of Leptothrix racemosa. The zooglea masses of micrococci so frequently met with in these microbic plaques are probably entirely composed of the spores, generally the crushed spore-heads, of our new organism. In Fig. 35 a spore-head is shown with a bare place where some of the spores have evidently been brushed off and are scattered about in the vicinity.* The most conservative and skeptical observer could, I think, have no hesitation in admitting that the scattered spores of various sizes and shapes came from the partially destroyed heads." (DENTAL COSMOS, 1899, pp. 345-348.)

It will suffice to glance at Fig. 12 of my work, or at Figs. 12 and 17 of Williams's (*ibid.,* pp. 327 and 331), to acquire an approximate idea of the large diffusion of this organism in the mouth as a true *excluding vegetation* (see pp. 136, 138 of the work and elsewhere), but in direct observations we meet with even larger and more conspicuous examples. I am somewhat surprised that such a luxuriant vegetation has made no impression on the minds of our critics. Starting with the average established by Naegeli, I estimated the entire mass of germs and bacterial elements of mouth and nose together upwards of two or three quadrillions. (See pp. 130, 131 of the work.) Of this figure four hundred and eighty trillions would belong to the *patina dentaria.* The said fructifications make nearly a third of the *patina,—i.e.,* one hundred and sixty trillions. Then if for each fruitful head we calculate an average of a hundred spores, the number of the *ears* in any mouth would amount about to a trillion and six hundred billions.

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*A more conspicuous exemplar of this kind was already drawn in Fig. 16 of my work, from a pulmonitic sputum.—VICENTINI.

At any rate, we may come to the conclusion that the Cladothrix buccalis of Goadby cannot compete for its diffusion with racemosa growths, and we may easily agree with the author in thinking that (even when positively recognized as a true and independent species) his Cladothrix form could not be assumed as a parent organism of the scattered bacterial elements of the mouth.

While thanking the author for his agreement with some statements of mine (p. 202), and for his kind private communications, I hope that by combined efforts much more light will be thrown on the subject, though my daily practical duties and other difficulties may forbid me to work further upon this field in the humble line I have been able to follow in the past.

NECROSIS, INVOLVING THE ALVEOLAR PROCESS, SUPERIOR MAXILLARY BONE, ANTRUM ON BOTH SIDES, HARD PALATE, AND NASAL BONES, RESULTING FROM ALVEOLAR ABSCESS.

BY W. H. DE FORD, D.D.S., M.D., CEDAR RAPIDS, IOWA.

(Read before the Iowa State Dental Society, at Dubuque, May 3, 1900.)

THIS case of necrosis, to which I call your attention, is one of the most extensive, and at the same time instructive, ever recorded arising from an alveolar abscess. It serves a twofold purpose, in that it furnishes an opportunity, first, to condemn a method of treatment almost universally recommended by physicians in acute alveolar abscess, and, second, an opportunity to censure the very common practice, both among dentists and physicians, of operating for necrotic conditions of bone before desquamation has taken place. As the result of placing hot applications or poultices on the face in inflammatory conditions, pus is drawn away from the circumscribed sac in which it would remain, burrows, destroying all tissues with which it comes in contact, widely spreading the infection; and frequently breaks upon the face, leaving a scar which is seldom obliterated.

Hot applications should never be applied to the face in cases of alveolar abscess.

The very bad practice of removing necrosed bone before it becomes detached unaided results in disfigurement of the parts, and frequently terminates in death of the patient from septicemia. The operation for necrosis should never be performed prior to desquamation.

The history of my case is this:

Mrs. M——, about thirty years of age, accompanied by her husband, was brought to my office September 30, 1899, by her dentist, Dr. C. B. Whelpley, for an opinion relative to a very serious pathological condition. On Friday morning, August 2, fifty-nine days previously, her dentist had filled a cavity of decay in the upper right first bicuspid with amalgam, the pulp having been removed and the root-canals filled at a prior sitting. In the afternoon of the same day the tooth became painful. Saturday it was more painful. Sunday the surrounding tissues commenced to swell. The cavity and root fillings were removed, access gained to the apical space, iodin and creasote applied to the gum. The desired relief was not obtained, and Tuesday, at the earnest solicitation of the patient (who had all arrangements made and was anxious to take a train that afternoon for Western Iowa), the tooth was extracted. The patient returned to her home, but instead of taking the afternoon train, took to her bed. In order to obtain much needed sleep, a physician was called to prescribe with that end in view. He not only ordered certain sleep-producing powders to be taken internally, but directed that hot applications be applied to the swollen face externally. Towels saturated with hot water were used for this purpose. It is not an easy matter to keep a hot towel in position on one side of the face, as you readily understand, so, naturally, the towels were evenly divided on each side of the nose, extending down over the upper lip, and one day a flaxseed poultice was ordered and placed in position as described. What was the result? The right cheek being saturated with that poisonous infiltration which precedes suppuration, the hot applications drew it down toward the lip, around under the nose, up into the tissues of the left cheek, resulting in the closing of both eyes, so great was the swelling. For three weeks the patient remained in a semi-unconscious condition, unrecognizable by friends, the offensive discharge so penetrating the room it was impossible to remain in her presence longer than a few minutes at a time. As soon as pus formed, at each visit of the physician, twice per day, the lance was inserted in two or three places and peroxid of hydrogen, full strength, injected. Even in her semi-unconscious condition, each injection of peroxid seemed as though dynamite were being exploded in her head, so terrific was the pain. You will remember that when peroxid comes in contact with pus oxygen is liberated, and it expands twelve times its volume. The mucous membrane covering the hard palate was distended with pus to such an extent there was scarcely room enough in the mouth for the tongue. From this time on, pus flowed freely. Upon arousing from a nap, one or more puddles of pus as large as a silver dollar would be found on the nightdress, pillow, or sheets.

Four weeks longer she was confined to the house before being strong enough to take out-door exercise. Seven weeks had now elapsed since the tooth was extracted, when she decided to make the delayed visit to her sister in the western part of Iowa. Two or three days after arriving at the home of her sister, she noticed a piece of loose bone in the gum over the right lateral incisor. Becoming alarmed, she consulted a dentist. Upon examination he pronounced it an extensive case of necrosis, predicting she would lose all the teeth in the upper jaw from molar to molar. Another dental practitioner gave the same opinion, adding that she would not only lose her teeth and the bone that supported them, but also a portion of the superior maxillary bone, and that so much tissue would be destroyed that an artificial substitute could not be worn.

You can well imagine the effect such information would have upon the patient, who as yet was not sufficiently strong to be up and around all day. The last dentist further said that the case was an unusual one, and advised her to go to an adjoining state, referring her to a practitioner well known in Iowa. The gentleman consulted in the adjoining state agreed with his fellow-practitioners in Iowa, pronouncing the case a serious and extensive one involving much tissue. He preferred that a colleague should see the case, and while a messenger was dispatched to that intent, called in a physician who had an office adjoining his own, and he was of the opinion that teeth, process, and portions of the superior maxillary bone must be removed. In the mean time, the gentleman summoned arrived, a man of extended observation and good ability, one who had made a study of oral surgery for some ten years. In his opinion, an operation was imperative, the sooner the better. The inflammation had already involved the superior maxillary and nasal bones, and he intimated that it was a case of life and death. She could not decide upon an operation away from home and friends. She did not feel that in her weakened condition she could survive an operation, nor, on the other hand, was she certain she wished to live, so great would be the deformity. What must have been her thoughts as she contemplated such an operation! The mother of two beautiful little children, the wife of a kind, generous husband, the central figure of a happy home, with everything to live for. She partially agreed to an operation, however, returning first to Cedar Rapids that her husband and friends might help her determine her course of action.

Her dentist, Dr. Whelpley, in whom she had implicit confidence, insisted that she should see me before making a final decision, and rely on my judgment in the matter.

This is the history of my case prior to the time I saw it, as ascertained from the dentist who referred the patient to me, the physician who had charge of the case after the extraction of the tooth, the husband, and the patient herself, an intelligent and refined little woman.

Early Saturday morning, September 30, 1899, I saw the patient for the first time. She was pale, emaciated, anemic. Having a short upper lip, the first thing noticeable was the color of the gum, it being a deep purple, almost a black, except a rim about a sixteenth of an inch deep just above the necks of the teeth, which was a trifle paler. This condition was present as far back on each side as the second bicuspid, and as high as the gum extended to the point where the mucous membrane is reflected back upon the inside of the lip and cheeks. There was neither sensation nor circulation in the gum. I pierced the gum to the process in several places with a sharp-pointed lancet, and there was neither hemorrhage nor pain. About on a line with the ends of the roots of the eight anterior teeth and a little higher were about a dozen fistulous openings. A number of small pieces of loose necrotic bone were peeping out of the purple gum. The incisors were loose enough to have been removed with the fingers; the cuspids and bicuspids somewhat firmer. Upon inspecting the hard palate, I noticed two pieces of loose necrosed bone at the posterior palatine spine, and removed them. Pus was draining freely from the fistulous openings. The space between the malar process and the alæ of the nose was still swollen and tender upon pressure. The upper lip possessed the sensation of stiffness, very noticeable upon laughing. The nasal spine of the maxilla and the nasal process of the same bone were very sore on pressure. Everything considered, it was the most hopeless-looking case of necrosis that ever came under my observation. In addition to the local pathological condition, the patient's constitution had been undermined; her vitality was at low ebb, her strength exhausted, and, in my opinion, she could not have survived an anesthetic. An operation, which was not indicated in my judgment, would have, I truly believe, resulted fatally.

The operation for necrosis is never justifiable until desquamation, unaided, has taken place, and that requires from two to fifteen months. Garretson says, "In the special treatment of the sequestrum, it is to be looked upon as a matter of importance that the dead piece be detached by nature alone. The period at which a sequestrum is ready to come away can only be known by repeated examinations, the proper treatment being to wait always till exfoliation is complete, be such time longer or shorter. Nothing is gained by expediting the removal through operative proceedings, as by breaking away the bone, using the chain saw, etc., while the risk to life, out of danger of septicemia, is very considerable. *To wait patiently,* keeping the system equal to the demand on it, is the surgeon's highest duty; to do more is to do harm."

Encouragement was what was needed, not an operation. I told her, in my opinion, "You have been unduly alarmed; your case is not so serious as you have been led to believe. You may lose one or two teeth, but I am confident I can save the bone and adjust an artificial substitute. If I am mistaken and an operation should be necessary, it can be done later, when you are stronger. If you wish me to take your case, in two months' time your cheeks will be red and your lips rosy, and you will be neither deformed nor disfigured." A great change came over her countenance; her face was radiant with hope, and she remarked, "That is the first encouragement I have received."

Before dismissing the patient, assisted by Dr. Whelpley, we supported the loose right central incisor, opened into the pulp-chamber from the lingual surface, and removed the pulp. A surprise was in store for us. I supposed, of course, the pulp would be in a state of liquefaction and putrefaction, but neither condition was present. A barbed broach was passed into the root-canal, rotated, removed, the pulp coming with it en masse, and with sufficient vitality to stand erect on the end of the broach, with no perceptible odor. A few drops of Wampole's solution were dropped in warm water, and the canal carefully syringed. Quantities of pus, followed by the solution, flowed freely out of the fistulous openings. There was one continuous cavity extending from second bicuspid to second bicuspid. The left central was opened in like manner, and the pulp found in the same condition. Disintegration and liquefaction had not taken place. Syringed as before, the solution finding exit through the fistulous openings. I was much surprised at the condition of these pulps, and at the time was unable to account for it. I wanted a little time to think, so dismissed the patient until Monday morning, seeing her Sunday at her home.

One of the most frequent causes of necrosis is the result of discontinuance of the supply of nutriment to the tissues. Burchard says, "If from any cause—surgical ligation of an artery, pressure upon it by effusions or new growths, degeneration or affections of the arterial walls, the pressure of an embolus or thrombus—the flow of blood to a part is arrested, the nutritive supply ceases and the cells dependent upon that vessel perish. If the entire venous outlet of a part be obstructed, there is not that removal of waste products necessary to the life of cells; moreover, access of nutritive material is prevented, and the parts die. Complete obstruction of the capillary supply to a part is followed necessarily by a cessation of nutrition in the part, consequently necrosis follows." Cohnheim says, "After interruption of the blood-supply, brain-tissue, renal epithelium, and intestinal epithelium die within two hours." Ziegler, that "skin, bone, and connective tissue live over twelve hours."

The great quantity of pus obstructed the nutritive supply; circulation was cut off, nutrition impaired, arteries, veins, and nerves approaching the teeth and gums were dead, and finally the bone itself succumbed. These fistulous openings had not arisen from the dead pulps in the teeth, but were simply outlets for the pus from the tissues above them. The pulps would have in time become putrescent, and then there would have been additional trouble.

Pepto-mangan (Gude), a preparation of iron, pepsin, and manganese, was prescribed, one-half tablespoonful in sherry wine three times per day. Pepto-mangan is the best blood-builder with which I am acquainted, and it acted like a charm. This was continued a month, then phospho-muriate of quinin substituted for two weeks with the Blaud pill, then the pepto-mangan again during October, November, and December. During January I discontinued all tonics, but renewed the pepto-mangan in February, continuing until the present time. As a mouth-wash, a teaspoonful of Wampole's solution in a glass of tepid water, the mouth to be rinsed at frequent intervals. Freedom from all household duties was demanded, and in their stead out-door exercise in the air and sunshine, walking up and down the porch, raking leaves, and working about the lawn, and as she grew stronger, longer walks and moderate exercise in the gymnasium.

Monday the patient returned. I opened into the left lateral incisor, left first bicuspid, and right cuspid; removed the pulps, and found them in same condition as those of the two central incisors, possessing sufficient vitality to stand erect on the end of the broach, and no odor. As the right lateral incisor and left cuspid contained good gold fillings, the root-canals having been filled some years previously, these teeth were not opened. The solution thrown into the central and lateral roots worked out of the fistulous openings above the eight anterior teeth. That thrown into the right cuspid and left first bicuspid passed into the antrum on their respective sides, making exit through the anterior or posterior nares, depending upon the amount of pressure used.

An hour each forenoon for three months was spent in thoroughly irrigating the parts, and it is hardly necessary to say that the heaviness, weight, and tension being removed, the offensive odor being destroyed, the patient improved every minute from the very first treatment. I had gained her confidence, and the battle was won.

The patient upon arising in the morning, by making pressure with the fingers upon the lip and cheeks, could force large quantities of pus from these fistulous openings, and at nearly every sitting I would remove one or more small spiculæ of necrotic bone from the gums. About the third week, when syringing the left lateral, I noticed for the first time a drop of blood. This meant the circulation was being established; new blood-vessels were being built up, and from that time on the gum-tissue commenced to change from a dark purple to a normal color.

About the sixth week the nature of the discharge was different. No longer was it offensive in odor; it was more of the character of a yellow exudate, and contained minute particles of bone, like very fine grains of sand; the necrotic tissue was in a state of liquefaction, some of it being absorbed, other parts coming away through the fistulous openings, and the larger parts working out en masse through the gum.

The first of December, the eighth week after taking the case, while playing a game of cards, a tickling sensation in the left nares caused the patient to sneeze violently, and she blew into her handkerchief a piece of necrotic bone about a quarter of an inch in length and an eighth of an inch in width, which I took to be a portion of the wall or septum between the antrum and the nares.

At Christmas you would hardly recognize my patient as the pale, bloodless, anemic person that entered my office twelve weeks prior to that time. Her lips were red and her cheeks rosy; her general health was never better, and she reported being able to do more work about the house than at any time in years.

January 1, 1900, the fistulous openings commenced to disappear. No longer could I force water through the openings via the root-canals, and I placed a dressing in these canals of campho-phenique, and sealed them in with cotton saturated with chloro-percha. January 24 I adjusted the rubber dam, removed the temporary filling and root-canal dressing from the left first bicuspid; there being no odor, filled the canals with chloro-percha and hydronaphthol powder, and the cavity with Ames's metalloid.

January 25 the right cuspid was completed in the same manner, the 27th the left lateral, and the 31st of January the left central. Four of the five teeth from which the pulps had been removed are now (February 1) in a healthy condition, firm in their sockets, and no evidence, upon inspection, is present to indicate they were ever in an abnormal condition.

What about the fifth tooth? In the early part of December the right central elongated, became very loose, and it looked as though it would drop from its position in the arch. A large section of the process immediately covering the root of this tooth broke away from its position and commenced to migrate. The lower part pierced the gum and rested on the labial surface of the tooth; the sequestrum moved from right to left, and in two weeks more the left margin had cleared the gum. A thin blade could be passed under its margin from the gum to a point a little higher than the apex of the root, at which point the gum covered the upper end. The side next the lateral was still covered with gum its full length. This was the largest single piece of bone at any time in sight. It continued to move gradually to the left, till there was a piece of bone exposed to view as wide as the central incisor itself. The little sharp point that pierced the gum resting on the tooth came away from the mass, and from that time the tooth commenced to tighten. About the first of February the side next the lateral had also passed out from under the gum, and now you could insert a thin blade under this side also, the only attachment being high up above the apex of the root. No discharge could be discovered, and the parts were healthy looking except a line of redness next the edge of the bone. Every day from that time on I expected to see my patient walk in with the sequestrum in her pocket-book. From the time it emerged completely from the gum it commenced to diminish in size; the thin edges were crumbling away and liquefying.

To have removed the sequestrum as soon as it pierced the gum would have been to have exposed the root of the central from gum-margin to apex; the tooth would have been lost. This piece of process, though loose, helped to support the tooth and protect the delicate new tissue beneath while it was forming. April 18 the sequestrum dropped out unaided, and there was not even a depression in the gum to mark its former position. April 21 the root-canal was filled with chloro-percha, and the crown cavity with Ames's metalloid, and the patient dismissed. The teeth are firm and comfortable, and not even discolored. The gum is in a normal condition; not a fistulous opening or sinus remains. It is my firm belief that every atom of process covering the eight anterior teeth was destroyed. All the blood-vessels and nerves supplying these teeth and the gums died as the result of discontinuance of supply of nutriment to the tissues, the blood-supply being cut off.

What would have been the result had an operation been performed in this case? Where would the operator have stopped? If an operation had been made, the surgeon must have removed all necrotic tissue. Imagine the result, horrible as it seems. First, the teeth must have been removed; then the alveolar process; that portion of the superior maxillary bone encompassing the antrum of Highmore; the nasal process and partition between the nares and antrum, and a portion of the hard palate, all the hard tissue from teeth to the thin bone supporting the eyeballs. It would have been impossible to have removed all of the infected territory, and after the operation the wound would have filled with serum, which, under the circumstances, would form the very best culture-medium for the micro-organisms to rush in and propagate, and the patient would have been poisoned to death in short order.

In conclusion, let me repeat: First, never place hot applications on the face in alveolar abscess, and, second, the operation for necrosis should never be performed prior to desquamation.

EDEMA OF THE ANTRUM OF HIGHMORE AS A COMPLICATION OF LA GRIPPE.

BY DR. W. W. COON, ALFRED, N. Y.

(Read before the Seventh District Dental Society of the State of New York, April 24, 1900.)

The maxillary sinus deserves the increased attention it has recently had. There are found there pathological conditions that have not yet become hackneyed subjects. The condition to which I am to allude is not so commonly recognized, although it is, I think, the most frequent pathological change the cavity sustains.

La grippe has a history dating to our earliest knowledge of disease. In the ninth century widespread epidemics of "catarrhal fever," or "Italian fever," are matters of history. Its name places it as an entity of the middle ages, when superstition regarding occult influence of the stars and other heavenly bodies gave it the name of the influenza, "influenza" being the Italian noun for influence. (See *Journal of the American Medical Association,* January 27, 1900, page 200; G. E. Crawford, Ph.D., M.D.) It has many names, and at the present time the Russian term, "la grippe," meaning the seizure, is perhaps most used. It is conceded to be contagious and infectious.

Pfeiffer, of Berlin, discovered the diplobacillus of influenza in the winter of 1893, which discovery has since been many times verified.

A fact of importance to the maxillary sinus is that the bacilli are found in enormous quantities in the nasal secretions at the beginning of the disease, later in the bronchial sputum and the blood. *Post mortem,* they are found in every tissue and fluid of the body. The disease spreads not by the wind, as was formerly supposed, but from person to person. In our day of rapid transit it may be carried to opposite sides of the continent within a week. The beginning of the present group of epidemics, starting from the region of St. Petersburg, where it is always endemic, in September, 1889, reached the confines of civilization before the close of the year.

Specialists are quite apt to magnify their point of observation. Dentists don't have to listen to a long discourse from nasal specialists to accept their statement "that chronic nasal catarrh is very prevalent in this country." It has probably, during the last decade, increased more than formerly. Our constantly changing climate, with its quicker and greater variations of temperature, makes us more susceptible by the many coryzas induced.

Tyson ("Practice of Medicine," page 392) says the observations of specialists go to show that almost every person is more or less subject to these catarrhal processes. Now, I am not going to contend that most subjects of chronic nasal catarrh have their antrums involved every time there is a change of temperature, or that most cases of la grippe suffer an invasion of the antrum, but it is very obvious that the accessory cavities and cells—frontal, sphenoid, ethmoid, and maxillary, the lining membrane of all being continuous and quite contiguous with that of the nasal cavity—*are often* involved.

Catarrhal subjects are more susceptible to the contagion of the la grippe bacillus, which is, in one of its constant effects, a *specific* catarrh producer. I have seen and treated a few cases. Having seen no mention in our journals of the prevalence of the condition, I am pleased to make it the subject of this short paper.

A case that will be taken as typical was supposedly a severe facial neuralgia. The attending physician had me see to excluding the teeth in way of finding the cause. The patient, a young married lady of apparently thirty years of age, was quite ill with the grippe, and for the past twenty-four hours had suffered intense pain in the right side of the face. Mouth examination found the right upper second bicuspid quite sensitive to percussion, and all the upper posterior teeth somewhat sore to pressure. Some fillings were contained, but all teeth were with live and apparently healthy pulps. Cheek was slightly swollen, and the whole antral region painful and sensitive to pressure. Question as to discharge from nose elicited the fact that there had been perhaps more discharge from that side than the other, also that there had been some pain several days in the antral region.

The treatment of these cases is simple, and is as effective as it is simple. The first indication presenting to dental thought is the local use of the tincture aconite and iodin, to which may be added to advantage one part or less of turpentine, on the gums over irritated peridental membranes. Some of the cases, however, present very painful antrums without any tooth or teeth participating, and this part of the treatment is the least important.

Now, the first thought of treatment for alleviation of cause is naturally to open a dependent locality of the sinus and apply by irrigation or spray the indicated medication. This is rarely necessary. These grippe people have quite a temperature, and the nasal secretion, which is always increased, is apt to become desiccated and somewhat hardened in a way to make difficult, or impossible, easy exit from the antrum into the middle meatus of the nose by way of the ostium, which is most usually, though not always, present.

Pain is quickly alleviated, the nasal and all communicating cavities bettered in condition by sterilizing, and at the same time softening the nasal contents and membrane, maintaining all the cleanliness possible. This has been best accomplished by the use of lanolin incorporated with hydronaphthol in sufficient quantity to maintain sterilization. Lanolin is a cholesterin fat obtained from sheeps' wool. It does not become rancid, and is characterized by remarkable penetrative powers. Hydronaphthol is a disinfectant with which most of you are probably familiar. It is a powerful germicide, non-poisonous, and freely soluble in the fixed oils. I have never seen anything but good results from its use in the nasal cavity. If an antiseptic douche is contemplated, it had better not be a douche at all, but simply sniffing a mild liquid antiseptic. I have long made use of Parke Davis's nasal tablet No. 34, which, by the way, is also most excellent for a mouth-wash. More hurt than good is often occasioned by forced washing of the nasal cavity. If a fountain syringe or irrigator is used at all, the container should not be higher than the eyebrows, and so avoid too great pressure.

These cases usually come into a comfortable condition in a remarkably short time when treated with the lanolin hydronaphthol preparation. The patient is directed to recline, when lying, in the manner most conducive to drainage if there is much discharge.

At the present time a lady, unmarried, age between twenty and thirty, who came to me for mouth examination, to find cause of persistent neuralgic pain that commenced several weeks ago when the grippe was being entertained, is following this treatment most successfully. I was at work on this paper at the time of the first visit, and did not learn that she had been ill. The simple statement was made that for several weeks there had been intermittent pain in the left side of the face, and, although no tooth was the least sensitive, she hoped I could locate the cause there and find alleviation. All the teeth were found healthy, excepting a commencing caries on the approximal surface of one of the upper molars of that side, although I mentally concluded it too insignificant to cause or contribute to the pain. The cavity was attended to in a manner to *certainly* exclude it, and the lady, much pleased, left the office in expectation of peace, and I returned to my desk to continue a little work on this article. Next morning, however, the woe-begone countenance of yesterday's pleased patient presented, saying there had been no change whatever. This time my mind was free from concentrated thought regarding antral involvements that I had been interrupted in upon her previous visit, and it promptly concentrated itself on the condition. I began to inquire into the matter in detail, finding that, although there had not been enough soreness over the sinus to attract attention, no swelling and no soreness of the teeth, there had been a very noticeable increase of discharge from the nostril.

The treatment previously outlined was instituted with satisfying results, and now the third day (April 19), although there is still trouble, it is very materially lessened, pain almost entirely stopped, and will in all probability progressively decrease. When leaving home, the 23d inst., I was informed there had been no pain the past two days.

I have never yet seen, or perhaps I may better say, after confessing my diagnostic obtuseness, that I have never recognized a bilateral complication. In only two instances do I remember having found it necessarily expedient to open the antrum from the mouth. You will ask what proportion of hydronaphthol is used with lanolin, and I shall have to answer that I have never used anything but my judgment, a glass slab, and a wide thin spatula to aid in making the mix. Having no remembrance of seeing mention of the use of the ingredients in combination for any cause, I spread the lanolin on a glass slab and sprinkled the surface lightly with hydronaphthol, proceeding to rub it up, having first, however, sniffed some of the dry powder up one of my own nostrils to make mental record of the effect. No serious immediate effect is thus produced. A tear may be shed, but the unpleasantness soon passes, and all that is noticeable afterward is a slight increase in a more fluid secretion *and a free nostril.* I have never seen fit, however, to recommend the use of hydronaphthol as a snuff.

A quantity of the hydronaphthol lanolin preparation is given the patient for use twice daily, morning and evening. This is often enough to accomplish the desired result. A small wire only long enough for its intended use is flattened on one extremity, and on the other end a loop is formed for easier handling; the patient is instructed to place by its use a small quantity of the preparation on the outer wall of the middle meatus. I find by making a few mixes of the ingredients, using definite proportions, that hydronaphthol forms about ten per cent. of the usual consistence. It would be superfluous to delineate all or most of the pathological conditions to which the maxillary sinus is susceptible, and outline a differential diagnosis. It is sufficient to understand that the condition we are discussing is "a *specific catarrhal* invasion of the antrum of Highmore by the diplobacillus of influenza."

The progression of la grippe is found to develop its special antitoxin, which is concluded to restrain the system from new inoculation for at least one year, any recurrence during that time being considered a relapse.

I have wondered if subjects of low vitality, with habitual chronic nasal catarrh, would not be increasedly susceptible to a simple chronic catarrhal invasion of this sinus after sustaining specific invasion. I have said that I have not recognized a case of bilateral invasion. By this, of course, I meant a *simultaneous* invasion of both antrums. I saw one influenza subject where several weeks after the right antrum had exhibited the neuralgic pain and slight swelling of the cheek. The left side of the face became swollen, and a first bicuspid in which I had a little time previously placed a large gutta-percha filling, for a cavity that approached, but had not exposed, the pulp, was very sensitive to pressure, as was also, in quite a lesser degree, the second bicuspid. The upper posterior teeth of the right side had been a little sore at the time of pain, and slight swelling of cheek of that side, but I did not see or know of the condition at the time, as simultaneously with the sufferer's conclusion to have me look after the matter the condition mended. (Would that a like conclusion would always be followed thus!) But when this first bicuspid, on the left side, which had only a little time before required a gutta-percha filling, became sore, the lady came to the office for relief from a supposedly ill tooth. The symptoms were apparent of a commencing alveolar abscess, and, although I had judged the pulp capable of maintaining itself at the time of placing the gutta-percha, I now naturally concluded that it might have failed, and proceeded to find out. It was not more responsive to thermal changes than some pulpless teeth are. Its color was somewhat negative, having been filled long years with amalgam previous to its gutta-percha requirement; it was discolored, and, after removing the filling, I proceeded to bur toward the pulp-chamber. There had been secondary deposit evidently during the maintenance of the old amalgam, the pulp having receded; but I soon found enough of it to prove beyond the possibility of doubt that it was alive and enjoying good health. The cavity was nursingly dressed, and the tooth excluded in my own mind from the blame of the trouble. It has never been, and was not at the time, affected by pyorrhea.

No more was done than to alleviate the pain constitutionally and observe the case. The swelling, which was more than had been on the other side (of which previous condition I had now learned), gradually subsided. There was no pus-formation anywhere, and in a few days no further pain.

Thus will these cases run their course usually, and I believe many times unrecognized as to true nature of cause, being considered neuralgic pain that is necessarily a part of influenza or its sequel, to be relieved only by constitutional treatment; whereas recognition and proper local treatment will save much pain and drugging.

CERAMIC ART IN THE RESTORATION OF HUMAN TEETH.

BY J. LEON WILLIAMS, D.D.S., L.D.S., LONDON, ENGLAND.

(Continued from page 646.)

BRIDGE-WORK.

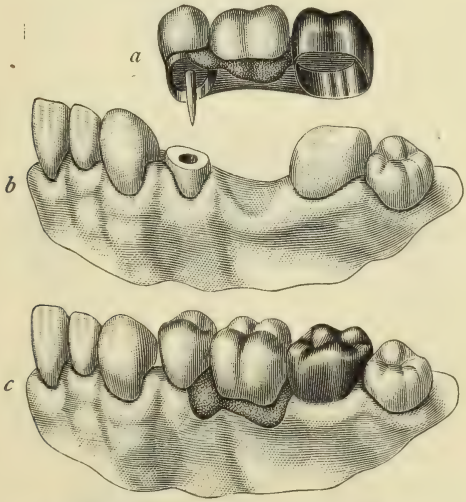
It is now somewhat more than fifteen years since I published in the DENTAL COSMOS the first series of papers that appeared on bridge-work. A majority of the leading men in the profession were hostile to this new method of restoring lost or badly decayed teeth. More than one eminent dentist announced that he had not and never would insert bridge-work in the mouths of his patients. Some of them, I believe, have stood by this declared intention, but as many of their patients have insisted on having this modern method adopted, they have avoided the humiliation of a broken vow by getting some one else to make the bridge-work. Probably the hostility to this method of inserting artificial teeth which we have witnessed—first in America, and subsequently in England—was largely due to the manner in which it was introduced. But it is no longer necessary to defend bridge-work. It has run the gauntlet not alone of quackery, but also of the condemnation of the "good and great," who were too proudly, if not wisely, virtuous to touch anything handled by the quack. Bridge-work has won its way and become established as a valuable method of practice. It would have been well for the profession and the public if its merits had been more quickly perceived.

That it has been abused to a greater extent than any other method of practice, except vulcanite plate-work, is, without doubt, true. But it is one of the functions of a sane and sensible human being to discriminate between the abuse and the legitimate and proper use of a thing. This was not done in the early history of bridge-work, and in this lack of good sense and wise discrimination on the part of leading practitioners the quack found his opportunity. I merely refer in this way to what is now ancient history for the purpose of pointing a moral and introducing my favorite hobby, which is that of a more perfect organization of our profession. With this more perfect organization there would be no possibility of the exploitation of an invention or a medicine by any one. We hear the threat of wholesale legal action in the United States against those who practice bridge-work, and in the April issue of the *Digest* we have Dr. Crouse intimating that he must have much stronger support if he is to continue the work of the Protective Association.

We are frequently told that legislation has not done away with quackery, but that it is stronger to-day than ever, and I am inclined to believe the statement is true. And yet the remedy is easy to find, and the application not difficult. If I could have the organizing of the dental profession I would undertake to stamp out all of the grosser forms of quackery, such as are presented by the advertising dentist and the limited companies, within two years without asking for a single new dental act or legislation of any sort. "But that's another story," as Kipling would say, and I can only touch upon it here. Such divergence from my subject proper as I have indulged in here is entirely prompted by that general indifference of the profession to its own best interests which we see exhibited in so many different ways.

I have, on several occasions during the past few years, called attention to the many defects in artificial teeth as supplied to us by the manufacturers. Others have pointed out these defects, notably Mr. Booth Pearsall, and as I write these lines the May number of the *Journal of the British Dental Association* is handed in with an interesting article on the subject by Mr. Quintin Miller, L.D.S. As Mr. Miller truly says near the close of his paper, ultimately "the blame rests wholly with ourselves as a profession." The manufacturer cannot be expected to supply a large variety of strong, finely made teeth of natural or artistic shapes and shades unless a majority of the profession demand them. If the British and the American National Dental Associations would pass resolutions affirming that improvements in the manufacture of artificial teeth were urgently called for, the makers would very speedily find a way for effecting such improvements.

FIG. 21.



The difficulties in securing teeth of natural shapes are well shown in some of the illustrations which accompany this paper. The top of the platinum cap seen at *c* in Fig. 21 was struck from dies made from a natural tooth. Compare the shape of the grinding-surface of the porcelain tooth adjoining this platinum cap, and also that of the two porcelain teeth shown at *c* in Fig. 22, which represent the best patterns I could secure. Observe how formal and untrue to nature the shapes and markings of these teeth are. I challenge any manufacturer of artificial teeth to produce a natural tooth which shall supply any justification for such shapes and markings as are seen in the two porcelain teeth exhibited at *c* in Fig. 22. And yet these are offered by the manufacturer as the latest and most artistic patterns.

FIG. 22.

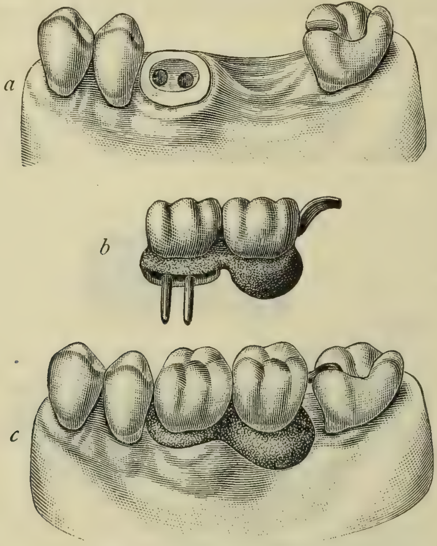
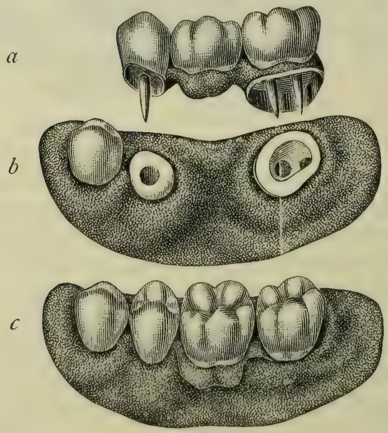


FIG. 23.

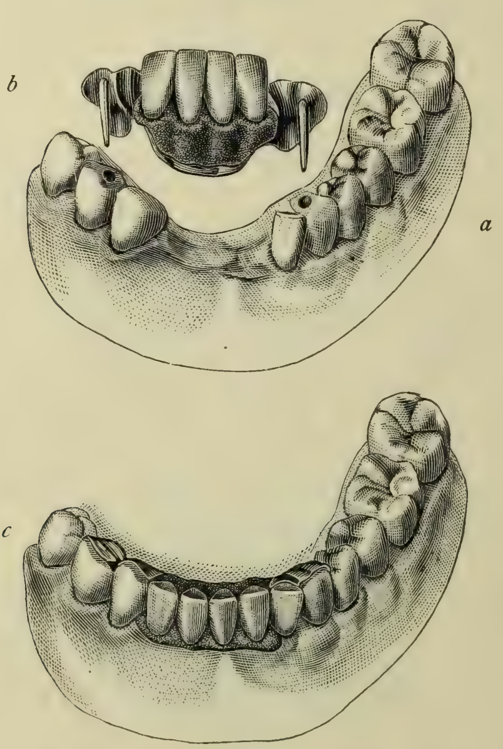


The style of bridge-work shown in Figs. 21, 22, and 23 was devised to avoid the appearance of metal in the mouth, and also the long, unnatural porcelain facings which are generally used to fill up the space caused by shrinkage of the alveolar process. This style of work rests upon the gum over the whole base of the tooth inserted, and there is, therefore, no "pocket" or depression for the accumulation of food *débris,* as in the ordinary bridge-work when the back is beveled from the inner side of the grinding-surface to the edge of the porcelain facings. I experimented for several years before I became firmly convinced that this is the best form for bridge-work where it can be used. It is applicable in nearly every case where the teeth have been extracted for one year or more. It is constructed in the following manner: The caps are first made in hard platinum, and the soldering is done with a solder made by alloying pure gold, twenty-two parts, with two parts pure platinum. Such a solder unites with platinum much more securely than does pure gold, and at the same time the melting point of the metal is raised to meet the great heat required for the subsequent porcelain work. After the caps are fitted and in position, dies are secured and a platinum plate struck to fit the gum between the caps. To insure that this platinum plate shall press closely upon the gum in the finished work, one or two thicknesses of tin pattern metal are placed over the ends of the roots or teeth before fitting the caps. The plate is adjusted and soldered to the caps while they are in this slightly raised position, and this secures the perfect contact with the gum, produced by slight pressure upon it, which completely excludes all forms of food-material. The caps and plate being united, the teeth are ground into position and *waxed at their outer edges only,* leaving the pins and all of that surface of the tooth quite bare. The fitting of the teeth being completed, a heavy platinum bar is fitted under and close to the pins and passing from one cap to the other, but with a slight space left between the bar and the plate beneath. The next step is the soldering of the teeth to the bar and the bar to the caps, with the gold and platinum solder.

In cases like Fig. 22, where it is desired to secure a rest upon a natural tooth, the hook which rests upon the tooth should be a prolongation of the hard platinum bar. In the fitting of the teeth to the caps and plate they should be allowed to touch only at a point in the center of the tooth underneath, thus leaving a little space all around the margin of the tooth, beneath which the porcelain body is carefully worked. This space and the space beneath the bar, together with the conformation of the teeth, will secure the body firmly. The body and gum enamel are applied in the usual way. Close's body and enamel should be used for The S. S. White Co.'s teeth, and Ash's for English teeth. The finished product is, in my judgment, the most perfect substitute for the natural teeth yet devised, and it is probably a cleaner thing to have in the mouth than the same number of natural teeth. The Custer furnace, with its arc light, makes the baking of this kind of porcelain work a fascinating pleasure. I must, however, criticise the method of attaching the arc light to the furnace as sent out. In place of the flat metal holder, which comes very close to the electric arc, the carbons should be held by upward curving arms, and thus the metal supports would be some distance from the intense heat of the arc.

Fig. 24 shows a form of bridge for which there is a constantly increasing need. The making of a plate to restore the lower incisors is one of the most unsatisfactory things the dentist is called on to do. It is impossible to get a firm bearing for such a plate unless it is carried back for some distance along the lingual surfaces of the bicuspids and molars, and its presence in such a position certainly tends to loosening and decay of the teeth it comes in contact with. Bridge-work is therefore a method pre-eminently suitable for such cases. Dr. M. L. Rhein has demonstrated that the devitalization and removal of the pulp in teeth which have commenced to loosen tends to preserve them longer than they would otherwise last. We need have no hesitation, then, in destroying the pulps in the teeth necessary for the attachment of such a piece of work as is shown in Fig. 24.

Fig. 24.

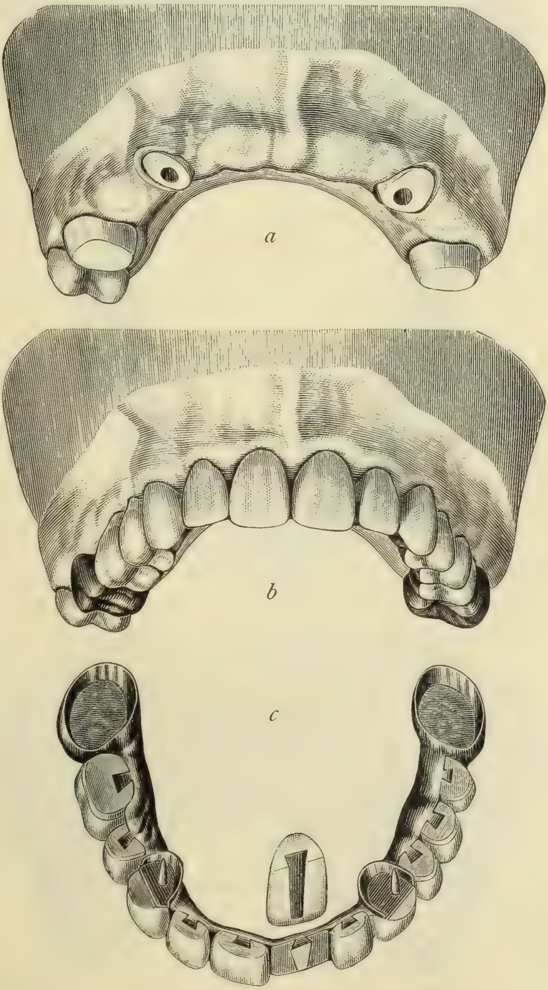


Three incisors had been lost from loosening, and the remaining left lateral and right cuspid were beginning to loosen. The left cuspid and right first bicuspid, being firm, were selected as anchorages. The piece was constructed so as to hold firmly the slightly loose teeth referred to, and the life of these teeth will thus be very considerably prolonged.

Fig. 25, *a*, *b*, and *c*, shows a case constructed with the new slotted teeth of which I have already spoken. All who are interested in bridge-work should see the merits of these teeth at a glance. I suggest that all who would like to see these teeth placed on the market should write to The S. S. White Dental Mfg. Co., expressing their desire, and if requests should come from any considerable number of dentists I have no doubt this company would be glad to undertake the manufacture of the teeth.

Fig. 26 shows a case presenting exceptional difficulties. All of the teeth back of the cuspid on the left side were lost, and there was considerable absorption of the gum on the anterior faces of the roots of the centrals and laterals.* This piece was constructed with the new "Dentinax" teeth, and all of the metal used, except the solder, was platinum. This permitted the baking of gum enamel onto the front teeth to cover the area of absorption over the roots. In all of these extensive cases in which the work does not rest on the gum my method is to make the case in three pieces, and then, finally,

FIG. 25.



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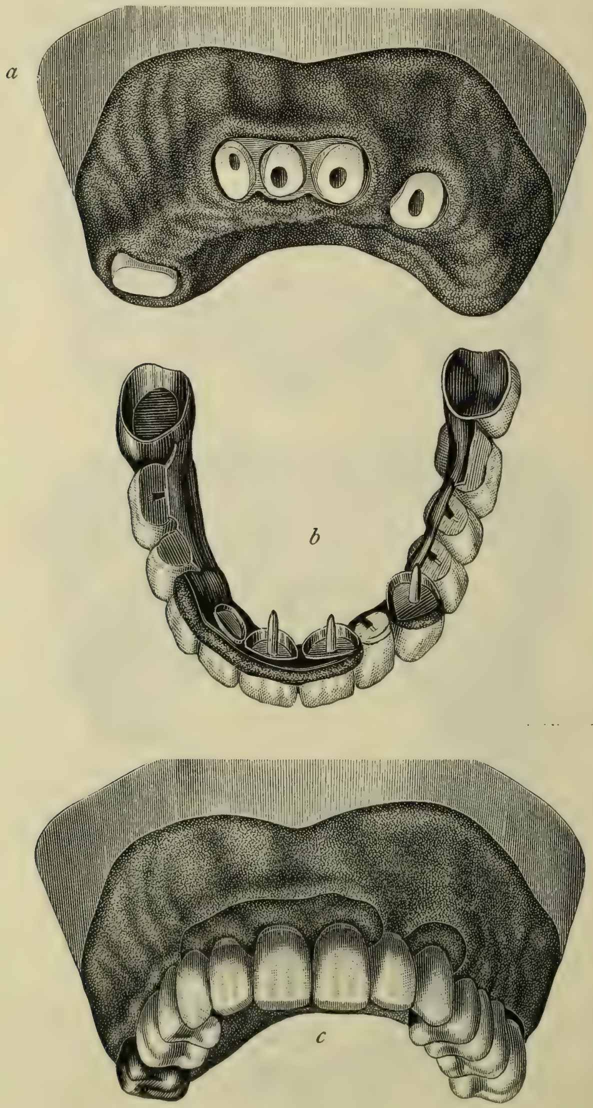
*The engraver has not succeeded very well in showing this absorption.

unite these pieces just behind the points of anchorage with wax in the mouth. Remove in an impression, transfer to investment, and solder. This leaves only two points for the final soldering, and thus the shrinkage is reduced to a minimum.

Fig. 26.



(To be continued.)

GOLD TIPS FOR ABRADED TEETH.

BY DR. GEORGE EVANS, NEW YORK, N. Y.

(Read before the First District Dental Society of the State of New York, February 13, 1900.)

In cases of mechanical abrasion of the teeth, in order to prevent further wearing of tooth-structure, the custom of many operators is to cover and slightly lengthen the incisive or occluding surfaces with gold. The lengthening of the teeth improves the occlusion, or, as many term it, remedies the "close bite." This operation has been, and is yet, performed mostly with gold foil or some of the crystal golds.

In cases of the incisors or cuspids a suitable cavity is formed in the central section of the incisive edge, slightly undercut as anchorage and foundation for the gold. Most operations of this character involve considerable labor. In result they largely depend on the skillfulness displayed in the condensation of the form of gold used. Gold foil or any of the forms of crystal gold are necessarily pure, one thousand fine, or very nearly so. This is necessary, as combined softness and adhesiveness depend on the absolute purity of the gold.

Pure gold in ingot form is a soft metal. In welding pure gold as a filling-material, a slight additional hardness can be imparted to the contoured section. This is accomplished by special manipulation of the consecutive layers of the gold during condensation. In cases of mechanical abrasion, almost invariably considerable force is exerted in occlusion, and consequently the gold is subjected to severe friction. Under such conditions the gold is indented and gradually worn away. In cases where the force of occlusion is more than the average, the contoured section in a short time has to be renewed. To secure a result that will better resist this attrition and force of occlusion, platinum has been used in combination with gold. There is undoubtedly a harder metal produced and greater resistance offered. My experience in its use, though, has not been altogether satisfactory, as in some cases I have been annoyed by the edges of the metal, at points where the force of occlusion has been severe, curling up and forming bur edges that have been very annoying to the tongue of the patient and requiring at intervals trimming and burnishing. Owing to the facts above mentioned, the method of constructing the artificially restored section with alloyed gold, secured by pins or posts and cement, apparently presented when it was introduced advantages over any style of operation performed with filling-material. These pieces of gold, ordinarily designated "gold tips," demand less excavation of the dentin to secure foundation or attachment in teeth with vital pulps, and as a rule are less laborious and complicated, and tax less the vital energy of both patient and operator. Owing to the fact that the contoured section of the gold tip can be formed of alloyed gold, the extremest possible hardness can be imparted to it. In the construction of gold tips in cases of living pulps, two or three small platinum pins are used in holes drilled about the pulp-chamber in the manner shown in Fig. 1 (and on model). Three pins should always be used, except in very small lower incisors, where the space will not permit more than two. The pins should be inserted and soldered in the gold plate one at a time, and the plate each time adjusted to the surface of the tooth. The first pin, if fitted tightly, can be soldered without investment. Each subsequent pin, as it is fitted, can also be soldered in like manner, if only an atom of solder is expertly used at each soldering. When this cannot very well be accomplished, the pins and plate must be invested. The ends of the pins should be allowed to extend beyond the gold cap the required length of the tip, Fig. 2 in section. The ends of the pins, when extended above the gold cap, will materially aid in maintaining the solder in position when fused, so as to furnish length and contour.

To give special length and contour, the cap is shaped with wax to the required form, and the wax enveloped with No. 60 to 120 gold foil; the light foil for short and the heavy for long tips. This foil, when the tip is invested and the wax washed out with boiling water, forms a matrix, into which solder can be melted (Fig. 3). The S. S. White Dental Mfg. Co.'s coin solder preferred. In case three pins are used, it is seldom necessary to extend the plate beyond the excisive edge over on the palatal side of the tooth. In restoration of the occluding surface of bicuspids three pins are required. In that of upper molars and lower molars three or four pins. In pulpless incisors, cuspids, and bicuspids one large pin extended into the crown and root-canal will furnish the required anchorage. Small globules of gold plate slightly flattened, or pieces of crystal gold gently packed around the protruding ends of the pins on the surface of the cap, will aid in giving the desired contour to an occluding surface in the soldering. In a case of extensive restoration, a piece of gold plate the form of the required occluding surface might be stamped up, fitted over the cap in proper position with wax, invested, the wax removed with boiling water, and the space occupied with the wax filled with solder.

FIG. 1.

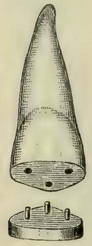


FIG. 2.

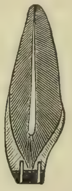
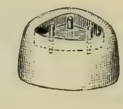


FIG. 3.



This description, so briefly given, will outline to the expert operator the method of procedure he is to pursue, but he will find that there are many little details of construction that have not been gone into or enumerated which will have to be learned to permit him with facility to effect the best possible results. It is my intention to endeavor to present to you by demonstration on this enlarged model of a central incisor some of the constructive details I refer to. This model I take in hand is intended to represent an abraded central incisor possessing a vital pulp. (Here demonstrated.)

To artificially restore the incisive edge of the teeth in the manner described I am aware that gold lacks the esthetic advantages of porcelain, but the properties of porcelain will only permit it to qualify in a limited extent as an agent in this special class of operations. A much larger proportion of men seem to be affected with mechanical abrasion than women. The age at which operative procedure seems indicated is generally past the middle age of life. The preservation of the usefulness of their teeth with them is much more than any other consideration. In most cases the shortness of the teeth renders them only slightly visible, and where a moustache is worn its presence usually obstructs the view of the gold.

One great advantage possessed by partial crown operations of gold over those of porcelain is that the edge of the base can to some extent be burnished against the enamel so as to form a water-tight joint after the tip or inlay is cemented. In a case of abrasion where decay exists on the approximal side of a tooth and extends to the incisive surface, the gold cap or matrix, when fitted to the incisive section, should be bent upward and adapted to the cavity. The approximal cavity, of course, must be so shaped that the adapted gold can be drawn from it in a downward direction approximating a right angle with the incisive edge.

Gold tips, when skillfully constructed and applied, cannot at a glance be detected from similar operations done with gold filling-materials. My experience in their practical use dates back about ten years, and they have proved to me in results all that I claim for them as a method in operative procedure.

I do not wish to be understood as advocating the use of "gold tips" of the construction I have described to the entire exclusion of operations with gold filling-materials for all forms of mechanical abrasion. I do not consider their use is indicated when the occluding surface of the enamel is only partially abraded or pitted. I commend their application to those cases wherein, for reasons, I first enumerated their advantages.

RESTORATION OF A BROKEN CENTRAL INCISOR WITH PORCELAIN.

BY W. D. TRACY, D.D.S., NEW YORK, N. Y.

(Read before the New York Odontological Society, March 20, 1900.)

Owing to the enthusiasm which has recently been manifested in regard to porcelain work, I thought the application of the inlay method to this particular kind of case might be of interest to your society, and will, in as few words as possible, describe the case and the way in which the tip was made.

The patient, a young man of seventeen years, had, by a fall, fractured the upper right central in such a way that it was about three-sixteenths of an inch shorter than its fellow on the left side, and presented a rough edge. The line of the break fortunately made a bevel toward the palato-gingival margin, thus giving a fairly large surface for the attachment of the tip.

After the outer edge was made perfectly straight and smooth, a cavity for retention was made in the dentin, avoiding the pulp, which was vital. An impression of the four incisors was then taken in modelling compound, from which a small cast was made. This cast, having been dried and treated with stearin, gave an accurate and hard working model of the fractured central and its near neighbors.

The platinum matrix was then burnished into the cavity on the cast, and partly filled with the porcelain body, care being taken not to get any of it onto the edges of the matrix, and baked to the fusing point. The matrix was then removed and placed in the cavity in the natural tooth, and burnished thoroughly to the edges and replaced on the plaster cast, where it was found to fit most perfectly.

From a selection of several of The S. S. White Dental Mfg. Co.'s old-fashioned "pivot tooth" centrals the one most closely approximating the color of the broken tooth was taken, and with a diamond disk in the engine its lower fourth was cut off and ground to fit as closely as possible the labial edge of the matrix, at the same time shaping it to restore the contour and expression of the tooth upon which the work was being done.

The next step was to attach this tip to the porcelain already in the matrix in such a way that it would be in proper position when finished. To this end the matrix, which is now placed upon the plaster cast, was filled with the moist porcelain body, which was allowed to run over all the edges except the labial, and the tip pressed carefully onto this mass in its proper position, where it was held by the moisture of the unbaked body. A fine slit was made between the palatal edge of the fracture and the edge of the tip, to allow for shrinkage. Baking the piece at this stage attached the tip to the porcelain already in the matrix without appreciable change in position, and a third baking filled the crevice caused by shrinking.

That part of the piece which was to come in contact with the cement was grooved for retention and etched by an application of hydrofluoric acid, after which it was dried and set in the ordinary way.

While the result of this operation was not in every way perfect, it must be admitted that the restoration of such a tooth as this, with a vital pulp, by the porcelain method is far in advance of anything that could be done with gold, from the esthetic point of view at least. In regard to its durability, I can only say that it has been in place since May, 1899, a period of ten months, and boys seventeen or eighteen years of age are not usually inclined to be very careful of their dental organs.

Having mentioned the use of stearin, a few words in reference to the material itself and to the method of using it may be of interest to those who are not familiar with it. It is a glycerid of stearic acid which is obtained for commercial purposes from animal fats, and, as supplied by the trade, is a white, pearly crystalline compound resembling tallow in appearance, and may be bought at any chemist's at twenty cents per pound. The most convenient form of vessel for melting the material is a small double saucepan, which makes it possible to reduce it to a liquid without fear of burning it.

The plaster cast, having been previously made perfectly free from moisture, is now placed in the melted stearin and allowed to remain about a minute and a half. As soon as it is withdrawn it is necessary to blow vigorously upon that part of the cast which represents the cavity for which the inlay is being made, in order to prevent a small quantity of the stearin from settling in the cavity, where it would otherwise harden and interfere with the accuracy of the work.

A cast treated in this manner will cool in a few moments, and will be of sufficient hardness to enable the operator to burnish a platinum matrix into it without breaking the margins of the cavity.

In some cases it is preferable to do all the work directly upon the tooth, but in many other instances the method of constructing an inlay up to the first baking, as just outlined, answers an admirable purpose, and is recommended as a great saving of time both to patient and operator, all the work up to the stage where the matrix is to be burnished into the tooth being done by the laboratory assistant.

The matrix platinum which has proved most satisfactory in my hands is that furnished by Claudius Ash & Sons, as it is more pliable and tough and less refractory than any I have found for sale, or any that I could prepare myself by annealing in the furnace over slaked lime, as suggested by Dr. Van Woert. It is furnished in sheets weighing one pennyweight, and is one one-thousandth of an inch in thickness.

TRANSLATION.

INSTRUCTION IN THE CARE OF THE TEETH AND MOUTH.*

BY C. RÖSE, M.D., MUNICH.

(Concluded from page 668.)

ARTIFICIAL CARE OF THE TEETH.

IN addition to the great mass of unthinking persons who are inaccessible to all hygienic teaching, an educated person is occasionally met with who purposely rejects all care of the teeth by artificial means as "contrary to nature." A well-known writer, for instance, a "nature healer," rejects tooth-brush and powder, using his finger and coarse flour instead. The gentleman seems to have forgotten that the finger is as much a foreign body in the mouth as a brush. Consider, besides, how well adapted is the wide end of the finger for rubbing bits of food and acid-forming flour into the

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*Copyright, 1900, by C. Röse, M.D., Munich.

narrow spaces between the teeth, a true culture-medium for bacteria in their favored resorts. Such a course is equivalent to ruining the teeth with malice aforethought.

We have to reckon with the immutable fact that the teeth constantly degenerate in direct proportion to the increasing refinement of living. The softer the food, the greater the degeneration of the functionally inactive teeth, and the weaker the muscles of mastication. On the other hand, the more imperfect the teeth and the weaker the muscles of mastication, the more necessary the use of soft food. Inasmuch as the natural means of cleansing the mouth no longer suffice, under these circumstances it is entirely rational to call in the more effective appliances of art. Dress is not a "natural" arrangement, but the most zealous devotee of nature will hardly ask that the Esquimaux should take his promenades naked in winter at a temperature of ninety degrees below zero.

Rational care of the teeth and mouth seeks to free the cavity of the mouth of all foreign substances.

The following are the most important foreign substances found in the mouth:

1. Bits of food and decomposed mucus.
2. Micro-organisms.
3. Products of such organisms and of the diseased mucous membrane.
4. Diseased portions of teeth and devitalized roots.
5. Tartar.

The following measures serve for cleansing the mouth:

1. Mechanical removal of mucus and bits of food by means of brushes, picks, and rinsings.
2. Excessive proliferation of micro-organisms is checked by special antiseptic mouth-washes.
3. Tooth-powders consisting of alkaline carbonates (lime and magnesia) are suitable for neutralizing the acids of the mouth.
4. Diseased portions of the teeth are to be replaced by fillings or artificial crowns; devitalized roots should be extracted.
5. Tartar must be thoroughly removed from time to time.

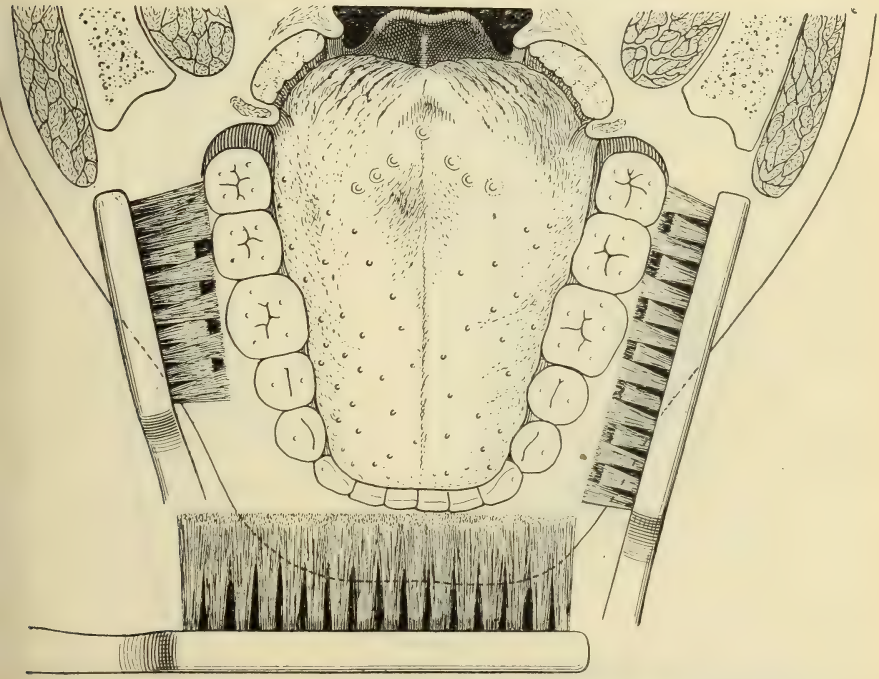
Of one hundred dental patients who seek the aid of the dentist for the first time, ninety-nine have failed to take effective care of their mouths. Some single tooth is painful. This offender is to be laid at rest. If the dentist consents to treat this tooth alone, without calling attention to the urgent need of further measures, he is of no real service to his patients.

Personal Care of the Teeth.

Tooth-Brushes.

It has been my custom for years to give at least one personal demonstration of the proper use of the tooth-brush. Professor Miller writes to the point when he says that "the management of the tooth-brush is a matter which very few understand and rightly practice," and that "a little sense, moreover, is necessary in cleansing the teeth." Unfortunately, "most brushes to be had in the shops are badly constructed, and frequently the most unserviceable of all is selected in the belief that the teeth can be best cleansed by large and stiff brushes." A perfect brush should fulfill the two following conditions: It should correspond as closely as possible to the anatomical conditions of the mouth, and it should not shed its bristles. It is extremely difficult to satisfy these two conditions. Perfect adhesion of the bristles cannot be secured by any known device. Faults are occasionally found in the most carefully made and expensive brushes. The task of adapting a brush to the anatomical conditions of every mouth in all positions is a still more difficult task. Figs. 20-23 show the various forms of brushes most commonly in use.

FIG. 20.



SEVERAL FAULTY BRUSHES, AS APPLIED TO THE TEETH IN THEIR NATURAL POSITION. Natural size.

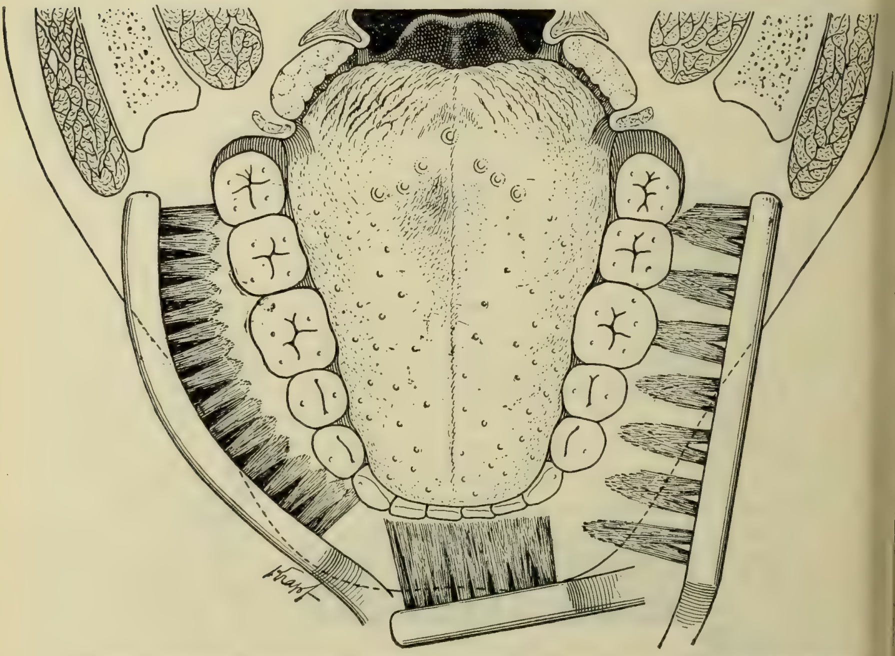
Brushes with large, straight surfaces and excessive length of bristles are the most irrational (Fig. 20, lower brush). Straight surfaces are not sufficiently adaptable to the dental arch. Where the bristles are of excessive length, the brush cannot be carried sufficiently deep into the cheek pouches to cleanse the posterior molars. This is particularly true in individuals with wide faces and tense muscles.

Among straight brushes, those possessing shorter bristles are to be preferred (Fig. 20). Naturally the shorter bristles wear out sooner, especially at the end of the brush. Moreover, the bristles, being too short, do not penetrate deeply enough between the teeth.

To correspond to the arched emplacement of the teeth, the bristle surfaces of some brushes have been cut in the form of an arc. The gingival arch is, however, not a segment of a circle, but a parabola. Besides, the size of the arch varies in different persons. A curved brush which corresponds perfectly to the front teeth of a broad face would be unsuitable for a narrow face. But for cleansing the molars such a brush is entirely unsuitable. (Fig. 21, left hand.) If the surface is cut flatter, to lie well against the molars, it will reach too few of the front teeth (Fig. 22).

Intelligent dentists have long recognized that large brushes are irrational, and that small ones are more suitable for the thorough cleansing of the teeth. Naturally, the surface should not be too small (Fig. 21). If this be the case, one or another tooth may readily be passed over during rapid brushing.

Fig. 21.

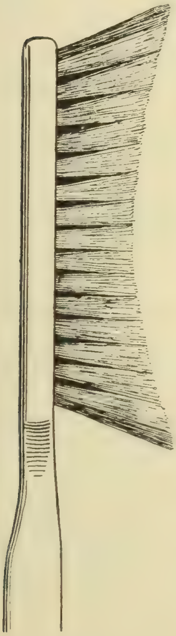


Several Faulty Brushes, as applied to the Teeth in their Natural Position. Natural size.

Simple cones of bristles for cleansing hollow teeth and hidden angles between such as are irregularly implanted, are figured by Maury as early as the beginning of the century, in his text-book of that date. The brushes shown in Fig. 21 (right side) and Fig. 23 have a cone of bristles at the end of a large surface, whose purpose is to reach and cleanse the sides and posterior surface of the wisdom-teeth. A glance at these figures shows that this purpose cannot be attained with the brush in question. These brushes have apparently been modeled upon a plaster of Paris cast, and not according to the normal conditions. They do not take into account the anatomical position of the masseter muscle and the ascending ramus of the lower jaw. If, for example, the bristle surface of the form shown in Fig. 23 is to take the desired position along the dental arch, an impossible position is required for the extremity of the brush *within* the lower jaw-bone and the masseter muscle.

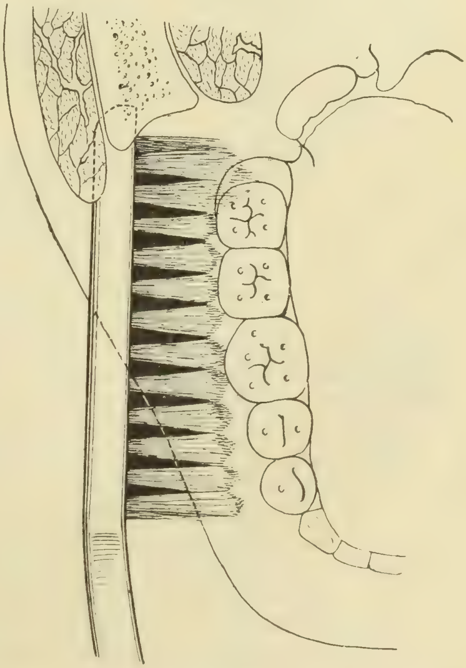
The brush shown in Fig. 21 (right side) is an example of those which substitute a number of separate bristle cones for the continuous surface. It is claimed that these brushes are specially adapted for cleansing the furrows of the teeth. A glance at Fig. 21 shows that this object is likewise unattainable. The intervals between the individual cones being invariable, and the intervals between successive teeth being variable, it is impossible that adjacent cones should correspond to adjacent teeth. Inasmuch as the stiff cones are not readily pressed aside, each one tends to prevent its neighbor from entering the furrows. It would lead us too far if we were to consider the numerous appliances which have been devised for cleansing the teeth. Some of these are clumsy; others are complicated. Many have been patented. Some of these inventions have been constructed by laymen who are superior to all considerations as to the anatomical structure of the oral cavity.

FIG. 22.



CURVED TOOTH-BRUSH. Natural size.

FIG. 23.



Intended but impossible position along the dental arch for tooth-brush with cone of bristles at the end. Natural size.

Invention has busied itself in these later days with replacing the traditional constituents of the tooth-brush, bone and bristles, by other materials, unfortunately without success thus far. The soft and yet elastic bristles required for a tooth-brush are obtainable only with difficulty in adequate quantity and uniform excellence. The attempt has therefore been made to substitute soft cones of rubber for the bristles. Such cones, however, like the finger, rub the bits of food from the surface into the dangerous interstices between the teeth, while the elastic brushes are intended to sweep the bits out of the furrows into the salivary current. In short, the construction of a proper, soft, and elastic brush is still the main function of the manufacturers of tooth-brushes. The material of the handle, on the other hand, is a secondary matter. Some manufacturers reject the traditional bone for this purpose upon the ground of cleanliness, and make use of celluloid. As a matter of fact, the celluloid handle was introduced for the sole reason that the bristles could be pressed into its soft mass by machinery, while the bone handles required the bristles to be inserted by more expensive hand labor.

From the standpoint of cleanliness, a good bone handle, such as is used in the better kinds of brushes, is at least as desirable as celluloid. It is, moreover, not a matter of so great importance that the handle is ideally clean. *It is infinitely more important and far more difficult to keep the brush itself perfectly clean.*

As compared with bone, celluloid possesses certain serious disadvantages. It is far too soft and flexible to permit the necessary manipulation. It is soluble in alcohol, and to a still greater extent in ethereal oils. Oil of peppermint, a constituent of every mouthwash, is destructive to celluloid brushes. The oil passes by capillary attraction up along the bristles, dissolving some of the celluloid where the bristles are implanted. In consequence the small metal anchor which holds the bristles loses its hold, the bundles loosen and fall out. Finally, the combustibility of celluloid is not to be forgotten. For these reasons I have been led to abandon celluloid entirely after years of unfavorable experiences. I shall continue to regard the traditional bone as the most useful material until some inventive genius shall furnish us with something better.

As the result of many years of uninterrupted experimenting, I believe that I have finally succeeded in working out a form of brush which at least approaches my ideal of what a brush should be. There is nothing entirely new about it; rather minor improvements and a happy combination of several individual advantages already known, which together go to make up the excellence of the new brush.*

The bend of the short curve-like surface is such that three teeth at least are exactly embraced in every position of the jaw. *No other brush is capable of taking advantage of every part of its surface in every position as completely as this one.*

The bristles are rather loosely arranged in bundles of three rows; each bundle terminates in a point. The hard extremity is thin and narrow, so that the terminal bundles, directed obliquely, project beyond the hard extremity by several millimeters (Fig. 24, C). The hard end is thus unable to injure the mucous membrane of the cheek.

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*I have unfortunately been unable thus far to find a suitable maker of this difficult brush. It is, therefore, not yet to be found in the market.

The essential advantage of the brush consists in the advantageous arrangement of the pointed cones of bristles, which are directed obliquely forward, and project several millimeters beyond the hard extremity of the brush.

This pointed cone embraces the entire lateral surface of the wisdom-teeth (Fig. 25), and surrounds their posterior surface, even if the pressure be still gentle. Some of the bristles also penetrate the interstices between the teeth and cleanse them as thoroughly as this can be done by a brush.

The most useful mechanism is, of course, at a disadvantage if it is improperly used.

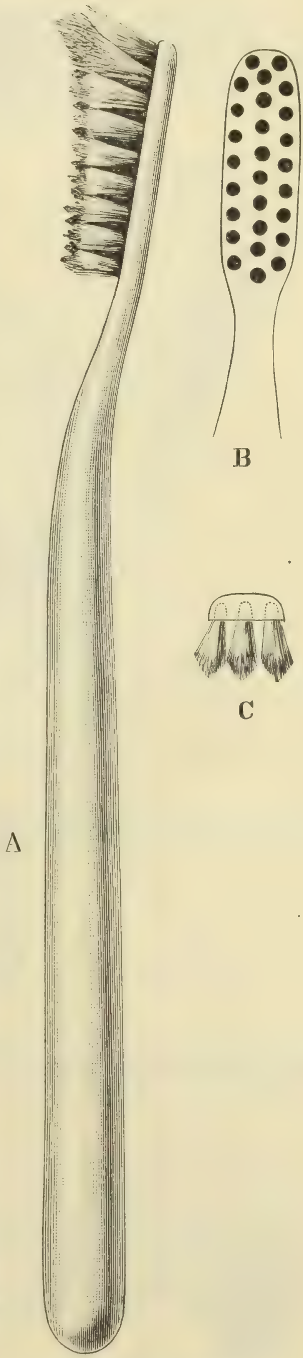
How Should the Teeth be Cleansed?

The mouth is first to be rinsed, in order to remove coarse, loosely adherent remains of food. The brush is next moistened; some mouth-wash is held in the mouth; the edges of the front teeth are brought together, and their external surface brushed up and down, as shown by the arrows in Fig. 26. The external surfaces of the molars are also to be brushed, especially in this way, from above downward, as shown in Fig. 27.

The mouth is next to be widely opened, and the grinding-surfaces of the bicuspids and molars are to be brushed from before backward and from left to right (direction of the arrows in Fig. 25, right side). The inner surfaces, as well as the interstices and angles of improperly implanted teeth, are then to be cleansed with the pointed cones.

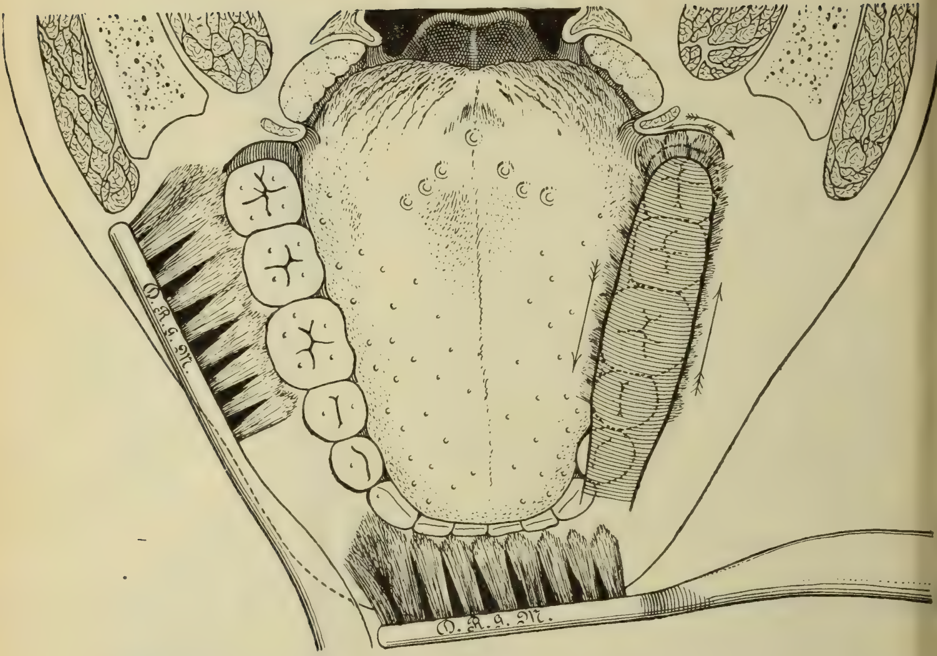
The gums are, at the same time, to be freed from any deposits. The brush is then to be turned outward, and the mucous membrane of the

Fig. 24.



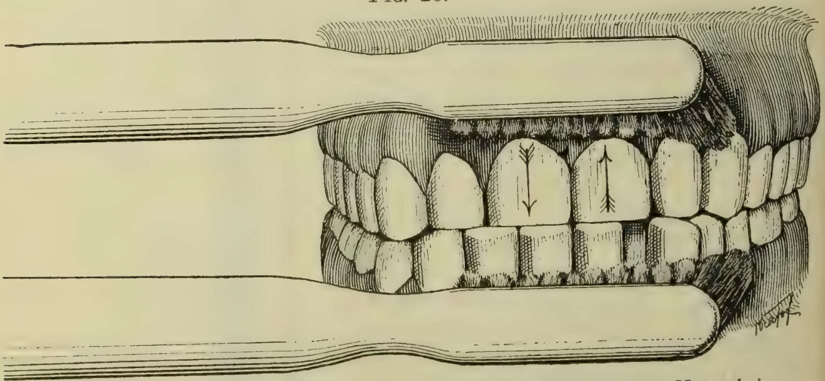
Dr. Röse's Tooth-brush. Natural size.

Fig. 25.



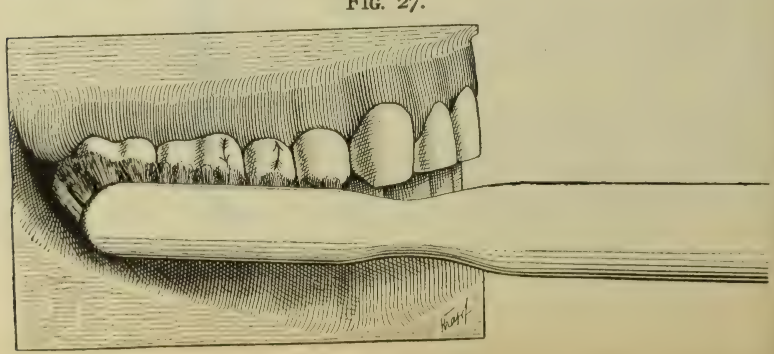
Dr. Röse's Tooth-brush in Different Positions along the Dental Arch. Natural size.

Fig. 26.



Movement of the Brush while Cleansing the Front Teeth. Natural size.

Fig. 27.

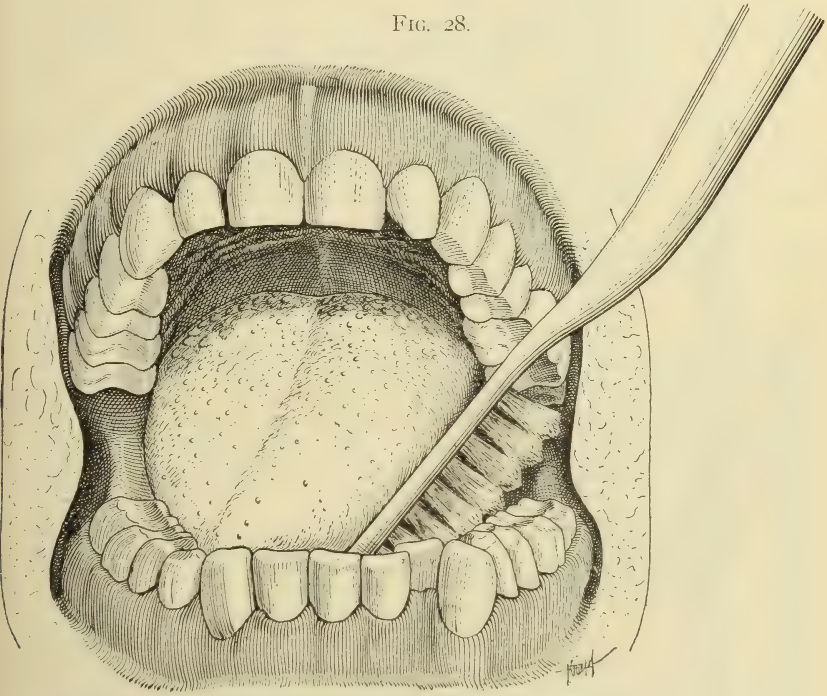


Movement of the Brush while Cleansing the Outer Surfaces of the Molars. Natural size.

cheek and the folds between them and the jaws cleansed. Finally, the tongue is brushed.

The dead superficial epithelial cells of the tongue, together with mucus, saliva, and bits of food, constitute the so-called "coating" of the tongue. Many persons use "tongue scrapers" for the removal of this coating. The advantages of these tools are as doubtful as they are unappetizing. The coating can be much more thoroughly and safely removed by the aid of the brush. Any tendency to nausea which may be provoked in the beginning quickly ceases.

Fig. 28.



Proper Method of Cleansing the Inner Surfaces of the Teeth. Natural size.

It is of the utmost importance to accustom one's self to retain a mouthful of water in the mouth while using the brush, in order that the product of brushing may be immediately taken up by the fluid, and not simply pushed hither and thither, as is the case when the teeth are brushed with the mouth empty.

If while brushing the teeth air is slowly inspired through the mouth, the head properly inclined, and a suitable small brush employed, the advantages of the above-mentioned process will soon be apparent.

Toothpicks.

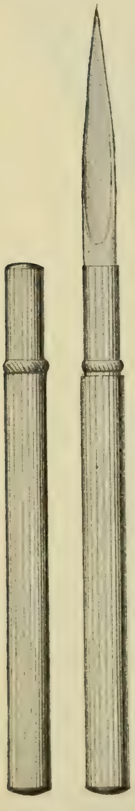
The narrow interstices between the teeth alone remain, in which no brush can penetrate. Tooth-picks serve to cleanse these spaces;

soft quills are the best. Nickel cases for carrying the quills in the pocket can be purchased in the shops.

Toothpicks made of thin pieces of tortoise shell or wood are less desirable, being too thick. Metal should be avoided by all means. It readily injures the teeth and gums.

The pick is inserted in an interstice between two teeth and gently rotated, scraping the bits first from one and then from the adjacent surface. *Excessive and useless picking should be carefully avoided.*

Fig. 29.



Quill Toothpicks in Nickel Cases. Natural size.

Exceptionally, the thin quill cannot be inserted between two closely placed teeth. In such cases the space is to be cleansed with a piece of waxed silk thread or stretched rubber.

Finally, the mouth is to be carefully rinsed several times, the fluid being forced back and forth in the intervals between the teeth by suction movements of the cheeks and tongue. Shaking the head, as is frequently done while rinsing the mouth, is a useless procedure.

After thoroughly cleansing the brush of any adherent matters by washing in clean water or an antiseptic solution, the fluid is removed by striking the brush against a resisting body. It is then hung up in the air to dry rapidly. It would appear more proper to place the brush after cleansing in an antiseptic mouth-wash, and to leave it therein until again required.

The ordinary porcelain cups for holding tooth-brushes should never be employed for that purpose; they readily cause the bristles to rot.

Unhappily, the so-called "family tooth-brushes" have not yet been altogether consigned to the region of fable. Servants also occasionally use their masters' or mistress's brushes on the sly. To avoid these dangers, it is advisable to provide a brush not only for each member of the family, but also for the servants.

Mouth-Washes.

Hygienic measures are practiced in proportion to the pleasant sensations they call forth. The mechanical cleansing of the mouth and teeth is not a process calculated to excite feelings of pleasure *per se.* Accordingly fragrant and tasty mouth- and tooth-washes have been recommended for centuries, instead of ordinary water for rinsing the mouth. The pleasant odor of these washes serves at the same time to conceal the fetid breath of such as require it.

After the bacteria had been recognized as the cause of diseases of the teeth and mouth, agents destructive of these organisms were naturally added to the mouth-washes. Many dentists even attempted to sterilize the entire oral cavity, with the idea of preventing caries in this way. The most powerful antiseptics were recommended for rinsing the mouth, without taking into consideration their dangerous properties. Trade soon came into this field, and the public was informed that the use of antiseptic mouth-washes was able of itself to prevent diseases of the teeth. If we consider that, in addition to the few really useful preparations, numerous worthless, and some even dangerous ones, all under the title of "antiseptic mouth-washes," were foisted upon the market, it will not seem strange that a justifiable opposition should have made itself felt. The brush! The wash! These were the shibboleths of this merry war. Finally a truce was arranged. Competent specialists are now agreed that while mechanical cleansing must ever remain the groundwork of all rational care of the teeth, suitable antiseptic mouth-washes are commendable.

A suitable mouth-wash should possess the following properties:

1. Absolutely uninjurious (*a*) to the teeth, (*b*) to the oral mucous membrane, (*c*) to the organism as a whole.
2. Effective antisepsis.
3. Pleasant taste and odor.

These various properties are naturally rarely found in combination, and yet each one is of equal importance. A mouth-wash which has a disgusting taste is as ineffective as one which has no germicidal action. The great mass of the public will never be induced to practice a method of oral hygiene which involves an ill-tasting mouth-wash. It is, of course, of the greatest importance to insist upon *absolute safety. The importance of oral antisepsis is not so great that we are justified in assuming the slightest risk.*

A mouth-wash may have the following untoward effects:

1. Toxicity to the organism as a whole.
2. Cauterization of the oral mucous membrane.
3. Decalcification of the teeth.

An agent which cauterizes the mucous membrane, such as corrosive sublimate, formaldehyd, kosmin, soap, etc., is *at least* as injurious as one which decalcifies the teeth. In consequence of the recurrent cauterizations, the mucous membrane finally inflames, forming an excellent field for the culture of pathogenic organisms. *As opposed to such effects, a suitable antiseptic mouth-wash must favor recovery of an inflamed mucous membrane,* which is so often present to a mild degree.

During the course of the last few years I have made extensive experiments upon the efficiency of the ordinary mouth-washes (Röse, "The Vegetable Parasites of the Mouth and their Destruction," Reports of the Society of Morphology and Physiology of Munich, 1889). I found that "odol," in spite of the exaggerated claims made for it in advertisements, must be regarded as the best known mouth-wash, in respect to safety, antiseptic power, and pleasant taste. Unfortunately, the maker refuses to reveal the chemical composition of his antiseptic. Among mouth-washes whose composition is known, that of Miller is to be commended. It is as follows:

℞—Acidi benzoici,	3.
Tinct. ratanhæ,	15.
Alcohol,	100.
Ol. menthæ,	0.75.

Sig.—One teaspoonful to a small wineglass of water.

The taste of this compound is not entirely unobjectionable. A pinch of table salt added to a lukewarm solution of odol or Miller's mouth-wash materially increases the germicidal effect of the remedy, causing it to assume the properties of 0.7 per cent. normal solution of sodium chlorid, which, as is well known, possesses decided anti-bacterial properties. Such a weak solution of table salt (equivalent to the quantity borne upon the point of a knife to a wineglass or a thimbleful to an ordinary tumbler of lukewarm water) is to be recommended for persons seriously ill, little children, and those of limited means.

The ethereal oils present in all the mouth-washes of the shops give rise to an eruption (eczema) at the angles of the lips in many persons possessed of a rather delicate skin. Individuals predisposed to such eruptions should confine themselves to normal salt solution as a mouth-wash.

One of the most important prerequisites for the successful care of the teeth is a healthy and firm state of the mucous membrane. The best remedy for the diseased membrane is a solution of fifty to sixty per cent. alcohol. Rinsing cannot, of course, be performed with such a solution, but we must be content to dip the brush into the alcohol before using. Excess in the use of alcohol is to be carefully avoided. The remedy is not suitable for daily use. Alcohol is like a whip, it fails of its purpose if too frequently used. Excessive application of alcohol in the mouth causes shrinking of the gums.

Tooth-Powders and Similar Articles.

We come finally to the last series of measures directed to the care of the teeth. Their great importance has been largely underestimated during the last decennials. Tooth-powders were originally meant for beautifiers alone. They were intended to remove deposits which could not be rubbed off by the brush alone, so that the fine natural color of the teeth might show.

Vanity alone causes a good many persons to care for their teeth. They like to have their well-polished teeth admired. Who could blame the hygienist if he tried to enlist this passion in his service? If for no other reason, the use of harmless powders is to be recommended.

The principal constituent of almost all tooth-powders in use is carbonate of calcium or magnesium. Both of these compounds exercise, beside their mechanical effect, a decided chemical action, in that they *neutralize the dangerous oral acids, the products of the caries bacilli.* Thus, while antiseptic mouth-washes directly destroy the germs, suitable tooth-powders destroy their products. Stronger alkaline solutions cannot be used to neutralize the oral acids; they cauterize the mucous membrane. "Dental soap" is, for the same reason, to be employed with great caution. The most perfect soaps give off free alkali in the presence of well water containing lime. He who insists upon using soap should at least use distilled water as a mouth-wash.

"Spirits of soap" may be *occasionally* employed by the dentist for the rapid cleansing of dirty mouths. The agent is entirely unsuitable for *daily* use. The entire oral epithelium strips off in long shreds after the use of the spirits, and the mucous membrane finally inflames.

"Tooth-pastes" are a mixture of powder and soap, with the addition of glycerin or a similar substance. They have, as a rule, the same disadvantages as the soap.

More gritty substances, like cigar ash, powdered pumice stone, etc., are not to be used; they are destructive of the enamel. We must, above all, be on our guard against all tooth-powders and pastes which rapidly give a glistening polish. They contain free acids which dissolve the enamel.

Antiseptic substances have been added to some tooth-powders. They are of no value, for the reason that the antiseptics can hardly undergo perfect solution during the short time of their presence in the mouth.

Vegetable powders, such as orris root, etc., which are often added to powder to make them more tasty, are to be avoided; they smear the teeth instead of cleansing them.

A suitable tooth-powder should consist principally of powdered calcium or magnesium carbonates, to which an ethereal oil may be added to improve the taste.

Many dentists entertain the opinion that the ordinary insoluble tooth-powders have the disadvantage of forming small masses with the remains of the food, and thus come to lodge in the interstices between the teeth. This is only possible when the cleansing is inadequate. But in such cases the mixture of the powder with the food possesses an added advantage. As soon as acids have been formed from the food, the alkali is there to antagonize the ill effects of the acid.

The fear that tooth-powder may favor the deposit of tartar is unfounded if the cleansing is thorough. Stimulated by the excessive fear of hypothetical disadvantages of the calcium powders, the attempt has been made during the last few years to prepare "soluble powders." These consist principally of bicarbonate of soda and borax. I have myself made many experiments for many years with the soluble carbonates, but have come to abandon them entirely. The salts are not gritty enough; their unpleasant taste can hardly be concealed, and is unbearable for any length of time.

The care of the mouth in nurslings requires a brief particular consideration. The mouth must be cared for even in infancy, especially during the time of the eruption of the teeth. Mothers and nurses usually wind a wet linen rag around their finger, which is then stuck in the child's mouth. Adequate cleansing of the mouth cannot be attained in this crude fashion. The delicate mucous membrane is frequently injured. A small soft tooth-brush or a pledget of cotton upon a stick is less injurious. A suitable small syringe would seem most appropriate for cleansing the mouth, while the infant's nostrils are closed by the fingers and the head inclined forward, so that the water (normal salt solution) shall return immediately.

The dentist is very frequently asked, "How often should the teeth be cleansed?" Persons with teeth imperfectly developed will do well to cleanse them after each meal; above all, after eating pastry, farinaceous sweets, or confections. The mouth is especially to be looked after while undergoing the "grape cure," after eating acid food, during pregnancy, affections of the stomach accompanied by acid eructations, and in the course of all serious diseases.

It behooves every physician who desires the gratitude of his bed ridden patients to provide for the regular care of their mouths. The oral epithelium is shed to a considerable extent in all febrile affections. In consequence of the increased temperature, decomposition takes place much more rapidly.

Simple rinsing of the mouth with a weak solution of salt gives great relief in such cases. Patients too ill to raise their head may be enabled to rinse their mouth by means of the medicine cup. Water is introduced into the mouth through the spout, and ejected in the same way after rinsing.

Whoever is prevented by external circumstances from cleansing his teeth more than once a day should do this *in the evening, before retiring.* Caries progresses most rapidly during sleep, when the cheeks and tongue are in repose and no current of alkaline saliva is present to inhibit the destructive action of the oral acids. *Whoever cleanses the teeth in the morning only is covering the well after the child has fallen in.*

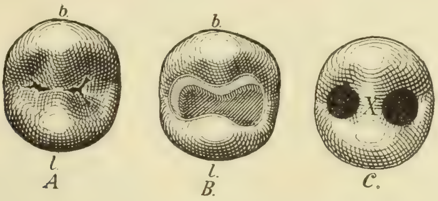
Dental Treatment.

Filling Teeth.

Filling teeth demands upon the part of the dentist careful and conscientious labor; upon the part of the patient a certain degree of self-control. Removal of the diseased portion of the tooth can only rarely be accomplished without some pain. Of course, a skillful specialist will cause his patients less annoyance than a clumsy workman. A reputation for skill is not rarely acquired at the cost of lack of thoroughness. The dentist who *never* causes pain, who ceases to excavate as soon as the patient utters the slightest complaint, will rarely put in a perfect filling. When we so frequently see unexceptional dentistry in the mouths of the Americans, the praise is not to be *exclusively* ascribed to American dentists; it belongs in large part to the praiseworthy self-control which is the rule in American patients.

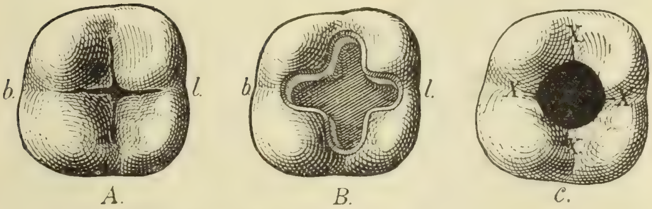
The walls of a carefully prepared cavity ready for filling should consist of healthy enamel. If the smallest bit of diseased tissue be left, caries will progress anew with absolute certainty from this point. Thin overhanging ledges of enamel must therefore be removed. If a number of separate foci of disease are present in the same tooth, and the intervening tissue is not perfectly healthy, they must be thrown into a single large cavity. Typical cases are shown in Figs. 30-33. A, before treatment; B, cavities properly prepared for treatment; and C, faulty cavities. The points marked *x* are certain to be attacked by caries sooner or later. The furrows of the grinding-surfaces of bicuspids and molars are frequently the

FIG. 30.



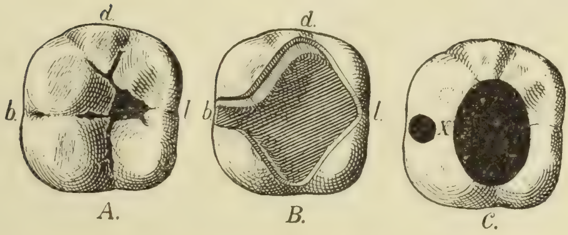
SECOND BICUSPID OF UPPER JAW. × 2.

FIG. 31.



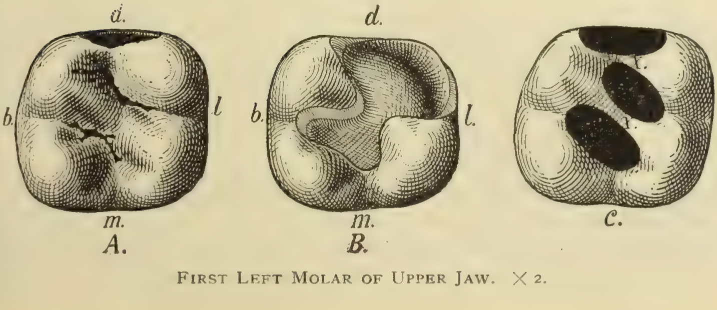
SECOND RIGHT MOLAR OF LOWER JAW. × 2.

FIG. 32.



FIRST RIGHT MOLAR OF LOWER JAW. × 2.

FIG. 33.

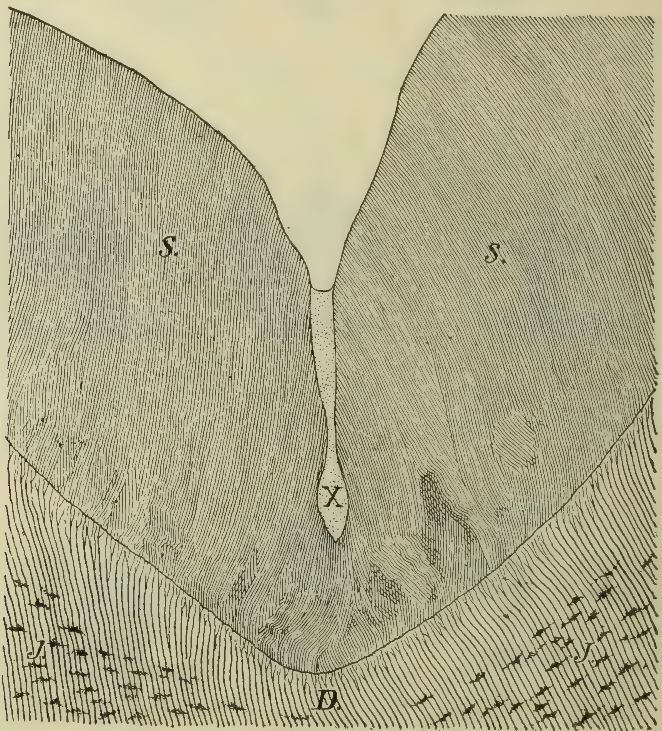


FIRST LEFT MOLAR OF UPPER JAW. × 2.

seat of imperfect development. Instead of the normal shallow furrows, deep and narrow clefts are found in the enamel; these clefts, if the teeth are still healthy, are occupied by tartar. If caries has attacked such points, the defectively developed enamel must be thoroughly removed, even if it fails to show well-marked evidence of disease.

Naturally such cross- and double fillings are more expensive than the simple ones shown in C. The saying "cheap and nasty" nowhere finds a more striking application than in the domain of dentistry.

Fig. 34.



Longitudinal Section of an Upper Bicuspid. *S*, *S*, enamel; *D*, dentin; *J*, developmental defect in dentin; *X*, developmental defect in enamel. × 36.

Patients who estimate the skill of their dentist solely by the number of their fillings, instead of their excellence, contribute largely to the flourishing of quackery. The most conscientious dentist finally loses interest in doing careful work if he is continually decried as high in his prices, although his actual income may be less than that of his less conscientious neighbor.

No general rules can be laid down for every case as to the selection of the material to be used in filling. The dentist is frequently only enabled to judge what material will be most suitable in a given case after thorough cleansing of the cavity. A well-inserted amalgam filling may be preferable to gold under certain circumstances; it requires, however, the same care in execution.

Patients frequently think it unnecessary to return to have the surface of an amalgam filling properly polished. As opposed to this, it must be insisted that only such fillings promise to be permanent which are perfectly smooth and join the enamel without a break.

The sooner a diseased tooth is treated, the more rapidly, painlessly, and cheaper can it be filled. For this reason *teeth should be thoroughly examined at least twice a year.* Many dentists are in the habit of making no charge for such examination. Moreover, any intelligent layman is capable of examining his own teeth by the aid of a mirror and sound. It goes without saying that all useless probing of the edges of fillings is to be strictly avoided.

It is of the utmost importance to *take the children to the dentist as soon as the earliest beginnings of caries are apparent.* The trouble can be remedied at such an early date without giving the child any pain to speak of. The child gets to like to go to "Uncle Dentist." If, on the other hand, painful souvenirs come to be associated in the child's mind with his earliest visit to the dentist, they are apt to continue through life.

If the pulp is inflamed, we fail as a rule to effect a permanent cure. Caustic (arsenic) must be inserted to cause the death of the painful part. Many individuals are possessed of a fear, altogether unjustifiable, against "killing the nerve." If skillfully done, the process is nearly painless.

When, after two or three days, the pulp has become painless, it is to be removed by a needle and the root-canals filled.

Where the roots are diseased, the pulp being devitalized, the ill-smelling root contents are to be removed, the root-canals thoroughly disinfected and filled.

It is self-evident that failures in the treatment of roots will occasionally occur in the hands of the cleanliest and most experienced dentist. Such treatment, moreover, is quite expensive. It is, however, money well spent to have diseased roots and such as are still firmly implanted filled, and, where necessary, provided with artificial crowns. *The most imperfect natural teeth are better adapted for the business of chewing than the best plates.*

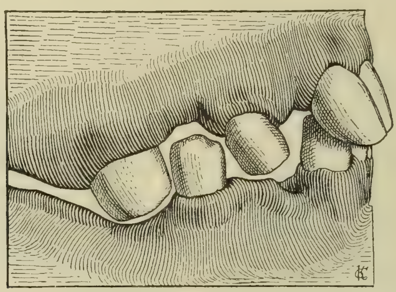
Coincident with the extraction of a tooth, the opposing one is rendered more or less useless. This opponent gradually lengthens and extends into the place of the lost tooth, until it comes to press upon the gum opposite. The three teeth shown in Fig. 35 resemble three single scissor blades, which cannot be used for cutting. The two teeth of Fig. 36, on the other hand, form a perfect pair of scissors.

Artificial Teeth.

In spite of every care, it is not given to every person to preserve the natural denture to the end of life. If the roots are capable of retention in the jaw after loss of the natural crowns, the former may be utilized for carrying "artificial crowns" of porcelain or metal. The term "bridge-work" is applied to the union of several artificial crowns in a single piece fastened to two or three supporting roots.

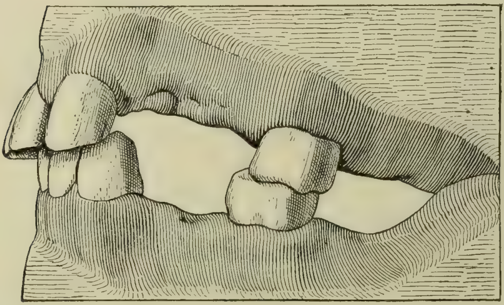
If the roots are incapable of retention, the question of a metallic or rubber plate arises. Most persons only bring themselves to the use of an artificial set after the front teeth have been lost. Not rarely a substitute for these teeth alone is desired. *The purpose of artificial teeth is not simply an esthetic one; they are intended rather to replace the masticatory function of the molars as nearly as may be.*

Fig. 35.



Denture showing Three Unopposed Teeth. Natural size.

Fig. 36.



Denture showing Two Opposite Teeth properly Opposed. Natural size.

In case the molars of one jaw have been lost while the front teeth are intact, and the corresponding molars of the other jaw are still present, artificial substitutes for the lost teeth are urgently needed to prevent the lengthening of the unopposed teeth of the other jaw.

Artificial dentures must be kept absolutely clean, otherwise they may become a source of contagion to the teeth still present. Denture and mouth should be thoroughly cleansed after each meal. At night the plate should be placed in a solution of dilute alcohol.

Extraction.

If an artificial denture is to be worn, it becomes of the greatest importance to fill or extract any roots that may be present in the jaws. *Nothing can be more disgusting in the whole range of per-*

sonal cleanliness than the wearing of an artificial denture over decayed roots.

It is, of course, a serious task in many cases to overcome the excessive fears of the patient, and to make him understand that *loose roots and stumps must be extracted under all circumstances, whether they happen to be painful or not.*

If, for any reason, the roots cannot be treated, they must be extracted, even if still firmly attached. Food and mucus can never be thoroughly removed by any amount of care from unfilled roots and stumps. The roots are therefore (1) a constant menace to the still healthy teeth; (2) a fruitful cause of diseases of all kinds, especially of affections of the stomach.

Cleansing.

A most important task for the conscientious dentist is the removal of the tartar as thoroughly as possible in every case of dental disease. This so-called "cleansing" is very often a most tedious and unappetizing task. Many persons, moreover, cannot understand why they should be expected to pay for this service. Who can blame the dentist if he does not volunteer for this unpleasant and thankless job unless specially requested? And yet such *careful cleansing of the teeth is the foundation of all care of the mouth.*

The deposit of tartar can be prevented, to a certain extent, by proper mastication and careful brushing. If it has once been deposited, the most zealous brushing and the strongest powders are incapable of removing it. The skillful hand of the specialist is alone capable of completely freeing the teeth by instrumental aid. *Acids (hydrochloric) should never be used to aid in the process.*

Special care must be taken to remove every vestige of the deposit in cases of pyorrhea; the diseased gum must also be treated medically.

Regulation

of improperly placed teeth in youth is a dental procedure which serves to diminish the tendency to caries. As already mentioned, four of the permanent teeth must occasionally be sacrificed to accomplish the object. Improperly placed teeth are almost always rectifiable in youth by the aid of art.

Proper Dental Development dependent upon Suitable Nourishment in Infancy and Childhood.

The structure of the teeth may also be influenced to a certain extent by proper nourishment in infancy. The food of prospective mothers should contain, in the interest of the unborn child, a sufficient proportion of lime and phosphorus. This is to be still more forcibly insisted upon in the case of mothers who are fortunate enough to be able to nourish their offspring.

Foods richest in lime and phosphorus are milk, eggs, all kinds of green vegetables; legumes and meat in a subordinate degree. In localities deficient in lime it is advisable to use lime or marl as fertilizers. *Nutrient salts naturally combined in food are much* *more readily absorbed into the blood than the same salts alone in a pure state.* Many physicians justly entertain a suspicion whether the chemically pure phosphate of lime which is frequently added to infant foods is actually absorbed by the blood. It is unquestionably entirely useless to feed children upon fluorid of calcium, this substance being completely insoluble in the fluids of the body. The administration of pure phosphorus in homeopathic doses appears to stimulate the secretion of calcium by the osseous and teeth-forming tissues.

"Gärtner's fatty milk," obtained by centrifugalizing cows' milk, is one of the best foods for infants who must be fed artificially. But mother's milk is and will always remain the best nourishment for the proper development of the child's teeth.

TEN COMMANDMENTS FOR THE CARE OF THE TEETH AND MOUTH.

1. Omit to wash your face rather than neglect cleansing your mouth and teeth.
2. Instruct your children as early as possible to take care of their teeth. The neglect of youth is not to be repaired in later life. The care of the milk teeth is just as important as that of the permanent set.
3. Beware of sweets and too soft food! Active mastication of firm, thick-crusted rye bread is the best natural preventive against disease of the teeth.
4. Do not forget, above all, to cleanse the mouth before retiring to sleep. He who only cleanses it in the morning covers the well after the child has fallen in.
5. Mechanical cleansing, by the aid of brush and pick, is the foundation of all artificial care of the teeth.
6. Antiseptic, but *harmless,* mouth-washes and suitable powders are entirely commendable to perfect the artificial care of the teeth and mouth. Measures which cauterize the mucous membrane or decalcify the teeth are to be unconditionally rejected.
7. The teeth should be examined once or twice a year by a dentist, in order that foci of disease may be detected and remedied before they have spread far.
8. Tartar is to be removed from time to time.
9. Diseased teeth and roots incapable of retention should be removed under all circumstances, no matter whether they be painful or not at the time.
10. See that the prospective and nursing mother is supplied with suitable food rich in salts (green vegetables, milk, eggs, etc.), in order that the teeth may be properly developed. Take care that the child is supplied with similar food after weaning.

CONCLUSION.

It is becoming constantly more and more the custom in civilized countries to instil into the minds of the rising generation during the years of school instruction the main laws of hygiene. May the authorities extend such instruction right soon to the domain of the teeth and mouth!

If any disease whatever is deserving of the name of universal, caries of the teeth is that disease. Do not ninety-nine per cent. of the school children of some localities suffer therefrom? By far the greatest number of diseased teeth become affected during school life and the years immediately following, while the ill effects of diseased teeth are most marked at that very period of youth and early adolescence, while the body is developing and consolidating. *If the time should ever come when the majority of all the children shall have lost the power of masticating their food properly, physical degeneration of the whole nation will be the inevitable result.* Private philanthropy should come to the aid of national and municipal authority in the dental treatment of the children of the poor.

Inexpensive measures looking to the care of the teeth and mouth are capable of effecting great results for good.

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PROCEEDINGS OF SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, February 13, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William C. Deane, in the chair.

Dr. David C. Baker, chairman of the Clinic Committee, read the following

Clinic Report.

The Clinic Committee beg to report that a clinic was held this afternoon at the New York Dental School, and that there was a large attendance. The following clinicians were present, and a summary of each clinic follows:

Dr. W. V-B. Ames, of Chicago, Ill., showed his new process oxyphosphate of copper, and a method by which the same is utilized for making platinum matrices in porcelain inlay work. The new process oxyphosphate simplifies the mixing, and insures a successful filling; whereas in the old if the mixture was not made in the proper proportions it would probably prove a failure. In using the oxyphosphate for inlay work the cavity is vaselined, and an impression taken with the cement. This is then mounted on shellac and used as a die, the counter being made by forcing the former into modelling compound.

Dr. William C. Deane demonstrated an easy method of retaining porcelain inlays and preventing thermal shock in deep cavities. The doctor also showed some imitation gold fillings on artificial teeth which are made by painting on J. Marsching & Co.'s gold paint mixed with spirits of lavender, which then receives two bakings; after which ground glass is fused over the filling to prevent its being removed by solution or attrition. The doctor also exhibited a very useful case, in which could be kept instruments and medicaments for emergency calls.

Dr. F. W. Low, of Buffalo, exhibited a formaldehyd sterilizer. The instruments are placed in a receptacle into which is directed nascent formalin gas, generated by a Low formaldehyd burner. The rationale of the burner is as follows: A cone of platinum is superheated, and then placed over a wick which is immersed in wood alcohol. Fifteen minutes is sufficient to destroy the most resistant spores. A detailed report of Dr. Low's experiments in this direction appears in the February Dental Cosmos.

Dr. C. F. C. Mehlig, of New York, showed a new instrument for trimming margins of approximal cavities in bicuspids and molars, and in buccal and lingual cavities.

Dr. L. C. Taylor, of Hartford, Conn., showed a method of mixing cement and amalgam. The method consists in making a mix of amalgam, same as would ordinarily be made for an amalgam filling, then taking one-third of the mix and working it up with oxyphosphate. The doctor claims superiority for this method in many cases that are too sensitive for the excavation which an amalgam filling would require.

Dr. W. H. Mitchell, of Bayonne, N. J., exhibited a water dynamo which he has used for two years, and which he showed last year before the New Jersey society. He could not, however, to-day get sufficient water power to properly demonstrate its use. The output of the dynamo is about ten volts and one and one-half amperes.

Dr. F. L. Fosheim showed a splint for loose teeth constructed by burnishing platinum foil into the grinding-surface of each tooth individually after the articulation has been relieved and a hole drilled where the enamel and dentin meet. Into this is sunk a platinum rivet going through the platinum foil. An impression is then taken, and the pieces fitting each tooth soldered together. The splint is then cemented in place permanently.

Dr. Harvey Iredell, of New Brunswick, N. J., demonstrated methods of applying rubber dam in difficult cases and varied positions.

Dr. T. W. Onderdonk, of New York, demonstrated the use of a matrix and dentometer, which seems to have a very wide range of utility. The same must be seen to be properly appreciated.

Dr. Wilber M. Dailey, of New York, filled a crown cavity in an upper bicuspid with Abbey's soft foil, using "diamond-pointed" instruments.

Dr. John C. Graft, of Newark, N. J., exhibited a new method of casting metal dies direct from original impressions, and a base-plate for mounting temporary sets of teeth.

The President. We would feel obliged to the clinicians of this afternoon for any remarks to supplement the report just read.

Dr. Ames. I might say that the use of the new process oxyphosphate of copper for getting impressions for inlays is the idea of Dr. W. H. Taggart, of Chicago.

Dr. Onderdonk. I could not in a few words explain the matrix I showed this afternoon, but I will be glad to show it and explain its use to any one who will come to my office.

Dr. Taylor. The clinic I gave this afternoon has grown out of what a great many have done for many years; that is, mixing cement and amalgam. When we mix cement and amalgam, leaving the cement exposed, it generally disintegrates and leaves a roughened surface, although it preserves the tooth well. I conceived the idea of taking one-third of the amalgam, mixing it with the cement, and besmearing the cavity with that; then forcing it to the walls and to the edges of the cavity with a ball burnisher, leaving just thickness enough so we have a body of amalgam covering it all. A filling made in that way looks like an amalgam filling, but it will not shrink as some amalgams do. It seems to stand very well indeed. An experience of five or six years shows me that it is far better in regard to preserving qualities than any amalgam I have ever seen; that is, for common, every-day plastic work. There was still another point that I brought out this afternoon, that I have had some very pleasant experience with. Most of us find in young people that the first permanent molars are very sensitive. It is almost impossible to excavate them thoroughly. Take the cement and amalgam; mix and force it with the finger into those fissures, and then take the ball burnisher and rub down the amalgam, which is a little harder than the cement. It is very plastic, and flows almost as freely as simple cement. Generally you can force it into the minutest fissure. You can fill these extremely sensitive teeth for children that will last for years and years with very little trouble. It seems like a small matter, and yet in every-day practice it is the little things that make up our life.

Dr. Hart. I would like to move a vote of thanks to the clinicians who devoted so much of their time to us this afternoon.

Motion carried unanimously.

The president then introduced the essayist of the evening, Dr. George Evans, of New York, who read a paper on the construction of gold tips for abraded teeth, which is printed in full at page 741.

Dr. Evans, in demonstrating, said, When I have the three pins in position in the cap I trim them off to the exact length I wish the tip to be. This extension of the pins beyond the cap is of great assistance in determining the length of the tip. Respecting the holes drilled to receive the pins, in these cases of abrasion there is generally a condition of considerable pulp calcification. I have never yet exposed a pulp in any of these cases. On two or three occasions only have I had any of these tips loosen, and I attributed it to the poor quality of the cement used. One was a lower incisor, an exceedingly small tooth, and the opportunity for getting a foundation there was very meager indeed. The hole in the palatal side is the most dangerous to form. I drill a little at an angle from the pulp, cautioning the patient to inform me instantly if he has any sensation. The drill I use is seldom larger than No. 20 United States gauge; sometimes smaller. It is well to countersink the orifices of the holes. I then take pure gold, or as I prefer gold plate alloyed with platinum, say two or three per cent., and place a piece 28 to 29 gauge on the end of the tooth; then I take a sharp instrument, an old broken excavator, and puncture it, making the smallest possible hole. I then take a piece of the platinum wire, 19 or 20 gauge, and insert it through the hole in the plate into one of the holes in the tooth, which it ought to tightly fit. Taking hold of the end of the pin, I then lift the gold off the tooth. I next wet my knuckle with a little saliva, place thereon some prepared S. S. White solder filings, take up one or two grains on the point of an instrument and place it on the wire in position. I then hold the wire in a Bunsen flame. I heat it up and carry it gradually to a point that will fuse the solder. When fused I carry the gold right into the flame, and the result is the solder runs into the crevice and just barely catches the pin in position. The quantity is small. There is no flux to be applied, as it is in the prepared solder filings. and I have the pin fastened exactly in position. There is this about soldering: solder always follows the line of heat.

The other pins are inserted and fastened in the same manner. Unless done in this manner, soldering each pin by investing is tedious. The solder also is infinitesimal, and the gold plate is not stiffened, and can now be accurately adapted to the tooth. You next work down the plate around the edges, using a gold foil condenser, also a revolving agate burnisher. The pressure will mark on the gold the outline of the incisive edge of the tooth. I remove and trim the gold in accordance with this line. To serrate or scratch the wire I lay it on a piece of wood; roll it under a coarse file. I thus get the whole surface of the wire roughened. This rough surface enables the gold to better catch itself to the surface of the wire, and the roughness also permits the cement to take a better hold on the pin when it is cemented to the tooth. This method is preferable to serrating. When first constructing these tips you are apt to trim the edge of the gold of the cap too much or not enough. The polishing and finishing should not be done in the hand to any extent, but on the tooth. It requires a great deal of nicety and exactness in detail to construct a tip properly and systematically.

Discussion.

Dr. R. M. Sanger, Orange, N. J. I have listened with a great deal of interest to Dr. Evans's clear and concise description of the method of making these tips, a method which commends itself at a glance for this class of work. In detail it is somewhat new; not entirely so, however, to me, because I have followed out something of the method which he has described. To go into an extended discussion would be wasting time, because there is nothing, from my standpoint, to be said except to commend it for its advantages in cases where it is very desirable to avoid (and they are many) the use of the mallet and the establishment of retaining points. There are many reasons why some patients cannot be subjected to the long process of malleting necessary to make these tips by building down with foil, and any method which meets the requirements as fully as this seems to, of restoration without subjecting the patient to that nervous strain, is to be commended.

Dr. J. Bond Littig. I do not think I have anything to add to Dr. Evans's description of the work which we have both been doing for so many years. You all remember when I started with the porcelain tips, and followed it out with the gold tips. I do not think the method has changed, except in a little detail.

Dr. William Carr. Dr. Evans, in drilling these cavities you are obliged to go pretty close to the dentin. Have you ever seen the tooth break down?

Dr. Evans. I am very careful in drilling not to go too near the pulp or too near the enamel. I drill slowly and very carefully. To drill these cavities in the incisive edge of the teeth one must be thoroughly informed on the anatomical structure of a tooth, and carefully calculate the amount of calcification that has occurred. I have never yet exposed a pulp in drilling those retaining points. In presenting this subject I know quite well that it has been practiced for years by others as well as myself, and perhaps even more extensively. I have spent some time studying out a systematic method of procedure in practicing it. I find many prominent members of the profession are entirely uninformed on the use of gold tips or the construction of them, and do not use them at all. This fact was an incentive to me, knowing their value, to bring the subject before the society this evening.

Dr. Sanger. Do you have any guide other than your eye in making those three holes? You spoke of a drill size No. 20 gauge, and the No. 19 or 20 wire necessary to make a close fit.

Dr. Evans. I said that, but, as a matter of course, the wire must be a shade smaller than the hole you drill. It does not amount to one number on the gauge. In many cases of small teeth I do not use No. 20. I might use No. 22, but it is easy to reduce the piece of wire a little, if it is too large, by taking a piece of sand-paper and twisting off the excess. It is exact work.

Dr. Carr. Do you ever have thermal shock with these pins?

Dr. Evans. Not as a rule. I have known of a slight sensitiveness to exist in a few cases for a short period after the operation, but it has always passed away in time.

Dr. Hodson. I do not think the doctor got the essence of what was asked him by Dr. Sanger. It is not a question of the fitting of the wires to the holes, as it is the parallelism of the three different ones. How do you get them right, if you only guess at it?

Dr. Evans. As far as my eye is concerned, I have not the slightest trouble. I have had cases in which the line of the pins deviated the least iota, but it is very easily corrected by enlarging the hole in the required direction. (Illustrating.) Regarding the sensitiveness of the dentin and position of the pulp, much depends on how rapidly the abrasion has gone on. In this case (model shown) I mention as having worked on recently, there appeared to be most extensive calcification of the correct portion of the tooth. The patient was between fifty-five and sixty years old. Sometimes we get this mechanical abrasion in people of forty-five, and at that age there is not the amount of calcification that there is later on in life.

Suppose I were drilling here, and the dentin becomes sensitive. I would lean my drill a little in that way and curve over to the side.

The hole would slant a little when I got through; the next hole I would endeavor to drill perfectly straight. I would then straighten the first hole with a very small fissure drill to the line of the second one. In forming one of these holes you only drill into the area of dentin that would be occupied by a gold filling in a fair-sized cavity.

We are apt to have trouble with the pulp in these cases. In drilling the hole for the pin at the palatal side I generally have to make the pin a little shorter than the other. I commence to drill in a direct line, turn outward a little as I drill if proximity to the pulp is indicated. I straighten the line of the hole afterward.

Another point in these gold tips is that you generally have more length of pin in the dentin than in the tip. There is a law of mechanics involved in this question. In such a case the tip has the advantage of having a greater proportion of resistance to leverage in the tooth, considering the fulcrum as being at the incisive edge of the dentin. If you form a tip, for instance, longer than your pins, you would have a greater proportion of leverage in the tip than in the pins, and there would be danger of loosening; but where the pins are longer than the tip there is not much fear on mechanical principles of loosening if the pins are properly cemented.

Dr. Ames. I want to commend what Dr. Evans has offered, because I know how good a thing it is, and I am glad every time I find something along this line. I believe that it would be better for our patients in general if we did more of this work in cases not only of abraded teeth, but of large cavities with frail walls. I have been doing this sort of work for quite a time, and often the remark is put to me, "Is the cement reliable? Can you depend upon the cement joint?" The more I have done of this style of work since 1889, the better I think of the operations and the more faith I have in cement for retaining. I construct gold tips similar to those described by Dr. Evans, which are also similar to those described by Dr. C. H. Alexander, which he calls cast gold fillings. I know I can handle some desperately bad cases with this plan where I would be at my wits' ends to know what to do otherwise. Sometimes a large cavity with frail walls in bicuspids and molars can be restored on the approximal sides toward the gingival borders or margins, and the bite elongated, if desired, at the same time. A gold tip will stand more attrition than gold packed in any way that I know of. I used to build teeth up laboriously and have the gold come back frayed out at the edges, and have the patient say, "Won't you please trim this off; the floss silk catches in it." With these cast plugs this does not happen. Where the tooth is pulpless and you get a strong dowel into the root, you can depend upon one of these cast fillings as a pier for a bridge. I saw one a few days since; a case where five or six years ago I had used a tip on a cuspid on the left side for one pier of a bridge, and a central or lateral on the right side. As I come across these cases for tips, the average case as it comes to me does not call for the extension or conspicuous tip represented by the specimen passed around. In the average case of abrasion the labial wall is rather thin, and does not need a conspicuous tip. In many cases I can keep the gold nearly out of sight by beveling this edge, having just a bit of gold show, and elongate the bite by contouring (illustrating) toward the palatal side. I have cases where the incisors, cuspids, bicuspids, and molars have been elongated, and from a view directly in front you would not know that the bite had been elongated, because this anterior plate of enamel had been retained. In using pins I have a scheme which seems to be sufficiently substantial. I perforate the plate opposite the holes, as Dr. Evans describes, and insert in the perforations a roll of the platinum and gold, passing it through the holes in the plate into the holes which have been drilled in the dentin; withdraw them with the plate, and flow a little solder in the interstices and attach them to the plate, which will give you a sufficiently substantial pin; and I don't care about the pins being made perpendicular. I bevel the edges of cavities, as in such a form the attrition does not get a chance at the cement in the joint.

Dr. E. A. Bogue. Will Dr. Ames kindly tell us if he considers the solder with which he solders gold and platinum foil sufficiently strong for the purpose?

Dr. Ames. I think so.

Dr. Bogue. How would you contour a posterior cavity in a first bicuspid, and an anterior cavity in a second bicuspid?

Dr. Ames. The beginning of such an operation, if it were a deep cavity, would be to get a rough impression of that with modelling composition, and make with plaster of Paris or oxyphosphate a rough model and roughly shape out the matrix, which I form of 36 gauge pure gold. You will in that way save considerable laceration of the gum, and save the patient some inconvenience. With that matrix in position the first solder to be melted would be in the deepest portion. If the matrix is carried between the cusps over into the farther sulcus, the first solder might be dropped into the deepest portion of that. You then solder and burnish the matrix, working out to the margins by degrees, never running the solder to the margins until you have it accurately fitted. When you have this pretty well stiffened up with solder, and out to the periphery in all directions, I then solder a globule of 22 k. gold in such a position as to outline the contour and occlusion. I sometimes also use additionally gold foil. All you then need to do is to melt solder into the interstices.

Dr. Baker. I would like to ask Dr. Ames where he puts the pins in the case he mentioned?

Dr. Ames. You outline your cavity as much as you would for foil, carrying the cavity through between the cusps, following the fissure and making a decided depression there. I do the anchoring there in the occlusal surface, perforating the gold opposite the depression I have made; put some foil through that perforation, and make what is really a pin in that occlusal anchorage.

Dr. Baker. In making gold tips I prefer to place two or three pins in position, take an impression in modelling composition or plaster, and make a little cast large enough to steady the pins and flow solder onto that. Of course, Dr. Evans can practice his method because he is an expert in soldering.

Dr. EVANS. I never had any trouble from thermal changes. I either bend the pins a little in or out before setting, so when the tip goes onto the tooth it forces itself in place; and if you put it in before you put the cement it is difficult to remove it. Then I put the cement on and force it into place until it goes home.

Dr. F. MILTON SMITH. Dr. Evans spoke of preferring two or three per cent. of platinum with his gold for his matrix.

Dr. EVANS. Yes; but you can use pure gold just the same.

Dr. SMITH. If this is a sample, I should find it extremely difficult to adapt it as readily as I do pure gold in these cases. Dr. Evans also suggests that he uses an agate burnisher, or some other burnisher, to get his metal in place on the tooth. I have found it much more satisfactory to use compressed hickory, rather rubbing it than crowding it into place.

Dr. EVANS. About exposure of gold referred to by Dr. Ames, I very seldom extend a tip of gold down in the manner shown in this specimen. I always preserve enamel at the anterior incisive edge as much as possible, but in many cases of abrasion, such as is, for instance, illustrated in one of these models I have exhibited, it is very thin and ragged, and must be trimmed down to form a smooth edge.

As to the cement washing out in connection with these tips, if it does it is because your tip has not been properly constructed. If the edges are burnished down, as they should be, the cement is hermetically sealed, and there is no chance for it to get out.

About removing three pins at once, as suggested by Dr. Baker, and soldering them all together, I would not expect to get a perfectly adapted tip constructed by any such method, from the fact that, in the first place, some one of the pins is almost certain to move as you withdraw it from position on the tooth; besides, you stiffen all the surface of the cap with solder, and it is impossible to bring it down and adapt it at the edges. You should keep that piece of gold soft and work down the edge hermetically with the condensers and the revolving agate burnishers while the cap is fixed in position on the incisive edge of the tooth. I anneal it frequently until I have the edge fitting absolutely. As to that small percentage of platinum placed in the gold to slightly stiffen it, it is just what I want, because the piece of gold retains its form with more certainty than absolutely pure gold.

Dr. BOGUE. Would there be any objection to using pure gold, get your adaptation, and then use gold and platinum over it?

Dr. EVANS. I do not need any stiffening of that kind. Take in your hand a bar of gold that is being annealed. It is a soft and flexible metal. Bend it once, and it bends readily; bend it again, and it is a trifle stiffer; bend it again, it is considerably stiffer; bend it a fourth time, and it is almost rigid. Burnishing hardens gold. I use a burnisher so by the time I get ready to remove the cap it is almost a rigid piece of gold. Where there is a small percentage of platinum in the gold in the amount I suggested, I think the gold stiffens under the burnisher still more. When the pins are in position, hold the cap, and you can burnish the gold as you would your edge of gold foil to a filling. When you remove the gold and solder it, the solder will stiffen it and retain it firmly in position.

A very cordial vote of thanks was given to Dr. Evans for his interesting paper.

Adjourned.

B. C. Nash, *Secretary*.

NEW YORK ODONTOLOGICAL SOCIETY.

A regular meeting of the New York Odontological Society was held on Tuesday evening, March 20, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city. The president, Dr. W. W. Walker, occupied the chair, and called the meeting to order.

Incidents of Office Practice.

Dr. Kasson C. Gibson. I have been requested by members of this society to come here this evening and exhibit a chart which I have had prepared for my lectures. With this chart it is necessary for me to make an explanation, which follows:

In the Dental Cosmos of February, 1900, is an article entitled "Is It Possible to Jump the Bite?" by Dr. Ottolengui. The following are extracts from this article:

"Jumping the bite means only one thing; it means the movement of the whole jaw so that it bites in a new position, and that position must be forward."

"The phrase 'jumping the bite' originated in connection with a forward movement of the whole jaw."

"If the upper jaw be reduced to normal only, and the lower jaw be brought forward so that the teeth and lips meet comfortably, the best cosmetic result will be attained. This is to be accomplished by jumping the bite, and by no other way."

"In the case which I present, Fig. 1, it was evident at the outset that the upper jaw should be widened, the protrusion reduced, and the bite jumped."

"The correction was readily accomplished."

"Model, Fig. 4, and examination of the mouth disclosed that the end was accomplished."

"I assure you that the models of the original case were accurate, and ask that in the interest of truth in science those who have examined the mouth and models will, during the discussion, express an opinion as to the result, remembering that it is about a year and a half since the appliance for jumping the bite was introduced."

I have taken the figures 1 and 4 from the article, which represent the jaw before and after the treatment. These illustrations I have arranged mathematically, and find from that standpoint no evidence of the bite having been jumped.

The space contained between parallel lines one and two in Fig. 4, as compared to those in Fig. 1, shows that the protrusion has been reduced.

Between the lines two and three, Fig. 4, as compared with Fig. 1, the occlusion has been changed, the bicuspids being forced backward.

The space between the second bicuspid and second molar is less in Fig. 4, owing to the bicuspids having been forced backward.

Between lines four and five, the molar region, there has been no change.

If the bite had been jumped, the molars would not have remained in the same relative position.

The horizontal lines A in Fig. 1, and B in Fig. 4, drawn from line one to the cuspid teeth, are of equal length, whereas if the bite had been jumped B would have been shorter.

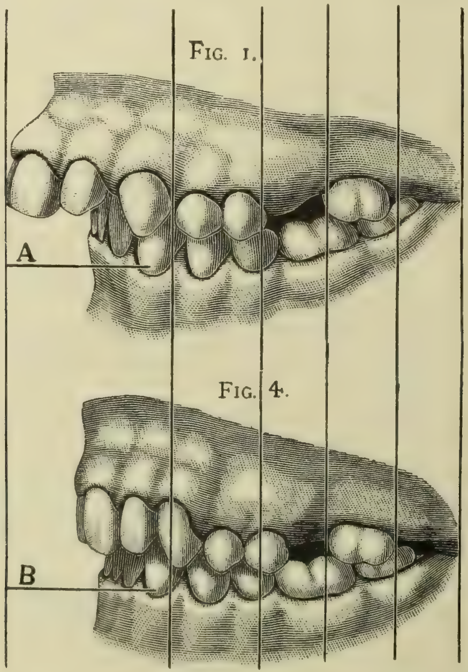
FIG. 1.

FIG. 4.

Again, if the lower jaw had been moved forward the width of a bicuspid tooth Fig. 4 would show the first bicuspid nearer or under the vertical line two.

Dr. S. G. Perry. To my mind the keynote of that chart is that the molars stand in the same relative position.

Dr. Gibson. Yes, but if the jaw had been jumped forward, Fig. 4, it would have been nearer line one, would it not?

Dr. Perry. Yes, certainly.

Dr. Rhein. Is this the case taken from the paper read by Dr. Ottolengui last summer at Niagara?

Dr. Gibson. No, sir; it was the case mentioned in the paper read before the First District Dental Society.

Dr. Perry. Have you ever seen a case in your practice where the bite has been jumped?

Dr. Gibson. I have no knowledge of the jaw having been forced forward beyond its normal position. I have forced the teeth forward, but have never attempted to force the jaw forward. In thirty years' experience in the treatment of cases similar to the one under discussion, I have simply accomplished what has apparently been done by others,—namely, the reducing of the deformity in the upper jaw.

Dr. L. C. LeRoy. In answer to Dr. Perry's question, I would like to say that I would use that as a weapon against Dr. Gibson, that he has never attempted to jump the bite. I will say it has been done, and can be done by any one who will try. I have in my office at the present time three cases; in two of them the lower jaw has been brought forward the space of a tooth, changing the occlusion entirely; and in the other the jaw has been jumped backward. It has been contended that that cannot be done, yet I have my models and the patients to prove it. I wanted to show that to Dr. Ottolengui, but he was out of town at the time. Dr. Kingsley saw it, and was very emphatic in what he said about it. I feel that I have accomplished both the anterior and the posterior jumping of the bite.

Dr. Robt. H. M. Dawbarn. I do not know exactly what is wanted of me here to-night, but am at your orders. This afternoon I brought some bones and other specimens here, and I understand from Dr. LeRoy that what you wish is a *résumé* of this afternoon's clinic. What I did was to demonstrate for those of you present at the New York Polyclinic College the air sinuses about the skull, briefly condensing the necessary steps in the diagnosis and operative work upon the frontal sinus, also upon mastoid and antrum diseases. Following that, I demonstrated the excision of one and a half inches of the superior maxillary nerve,—the second division of the trifacial,—and then of a considerable portion of the third division of this nerve,—both for the cure of obstinate tic douloureux; then I showed the control of nasal hemorrhage by accurate tamponage; the ligation of the lingual artery; excision of half of the tongue for cancer; an emergency operation (laryngotomy) for threatened death from swallowing food "the wrong way," and finally the anatomy of the larynx.

If the society will permit, I will now very briefly call your attention to a work I have been especially interested in during the last five years; that is, starving malignant growths about the mouth. Suppose you have a case of cancer of the tongue and of the floor of the mouth, that has gone beyond the stage where there is any hope for radical cure. There is not a more hopeless individual on the face of the globe. Under those circumstances I have in twenty-two instances operated, and I shall report the results on Wednesday, the 28th of this month, before the Surgical Society.* You know, once in about one and a half or two years each member of the Surgical Society is expected to read a paper and report on the topic which seems to him of greatest interest during that time. I

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*They will be published in the *Annals of Surgery*, probably the September number.

extend a cordial invitation to any one of you who is interested in this matter to be present on that occasion.

In 1895 I operated for the first time with the idea of shrinking a tumor by starvation. The man was a patient of Dr. M. D. Lederman, of this city. I found a sarcoma of the naso-pharynx, completely filling it; a small round-cell sarcoma. He had been treated thirteen times with injections of certain mixed toxins without doing a bit of good; on the contrary, they simply weakened him still further. He refused to continue on this line. In this case I tied both external carotids, hoping to starve the growth. In the following September I found that that growth had shrunk to about one-quarter of its former size. The patient was in excellent health. But very slowly at first, and afterward much more rapidly, the tumor began to grow again; until by January it was worse than ever. Then I operated, and cut out his upper jaw with the growth. It was the bloodiest operation I ever did in my life. It taught me a lesson as to the lack of permanent value of merely *tying* both external carotids. He would have died upon the table from hemorrhage if I had not given three liters intravenously of hot saline solution right at that time. He will appear when I read this paper next week. After the first operation (ligation merely) I looked up the anatomy, and found that there were between thirty and thirty-five different ways in which the tumor might still be receiving a blood-supply by small anastomoses. That explains why ligating alone will not suffice, and why more radical work is needed for permanency,—namely, cutting out or excising the external carotids from Dan to Beersheba. The internal carotids, it will be remembered, do not supply anything except the brain (roughly speaking), and the external do not supply the brain, but all the superficial parts. After an interval of ten days I did the same thing on the other side upon the patient under discussion. Cutting out the whole carotid is a pretty savage kind of thought, but the danger is not much over five per cent. of mortality. I will show at the clinic of the Surgical Society some half-dozen of these cases, dating back quite a number of years. Two of them were sent by Dr. Hart's college. One of them I have sent back to report to Dr. Suriani. His condition is excellent; the growth has shrunken to small dimensions. It was a very hopeless kind of case, and I was afraid at first I might have sloughing of the nose and tongue, but it has not occurred in any instance. You get no change whatever in the appearance, except that the tongue looks temporarily rather pale. Evidently the normal tissues bear anemia better than do the malignant tissues. It seems as if this plan gave these poor fellows a longer lease of life than anything I know of. If you have some charity case with a growth of the nose or mouth, send it along, and I will be glad to pay the hospital expenses myself; because only from dozens and dozens of these cases can one form a positive opinion. Suppose you have a case of sarcoma of the alveolar process of the upper jaw, not very far advanced. If I excise the superior maxilla, and it is the case of a young woman, the chance of her entering into wedlock is reduced several hundred per cent.

That is not to be forgotten. If the patient is under observation all the time, it seems to me to-day it would be justifiable to cut out her carotids. You cannot see the scar from this at a short distance, and it may be that the growth will not spread. It may even diminish, and it would not be such a mutilating and disfiguring operation as cutting out a large part of or the entire upper jaw, which, in case of a malignant growth, you otherwise would have to advise.

Dr. LeRoy. How is the collateral circulation continued in a case of that kind?

Dr. Dawbarn. There are more vessels left than I like to see. Two will occur to you right away. After you cut out the entire external carotid, the infraorbital artery will carry it down into all the ramifications of the face; and this artery communicates freely in the orbit with branches from the deep carotid. Then there is the occipital artery, anastomosing by its princeps cervices branch with the profunda cervices. Here are two chief arteries, not to mention the minor ones. If there were a tendency to continue growing I would cut down and tie the infraorbital and the occipital.

(Showing specimen.) This is the upper jaw of a young lawyer in town. The case was sent to me by Dr. J. Morgan Howe in 1896. Here is a tumor which has completely filled the antrum. I have removed part of the antral walls, so you can see how completely it fills it. When this case came to Dr. Howe there was a history that for four or five months there was a vague discomfort. When he examined it, there was nothing to be seen except a little swelling of the roof of the mouth. More on suspicion than anything else, he thought he would send it to a surgeon, and he sent it to me. I found the bony region, instead of being dense, could be penetrated by a pin or an ordinary sewing needle. Here in the roof of the mouth, where the bone is normally dense, I can, you see, shove a pin right in up to the head without any trouble. In the same way, above the alveolar process, I can do the same. If I had seen it two months earlier I would not have been able to do it so readily. If you can introduce the point of a pin so it will stick in the bone, you may be sure the decalcifying process has begun, and it is well to be on the lookout. I not only removed this upper jaw, but, as the prognosis is so very certain of its coming back, I cut out both carotids. That was four years ago, and if you care to come to the Surgical Society meeting aforesaid you will see him there. Dr. Howe subsequently sent him to Dr. Bishop, of this city, who made a half-set of teeth and a plumper for the cheek, and he has practically nothing to show for his condition except two delicate lines, one on each side of the neck. You can hardly notice the scar on his face.

I have recently shown to various societies specimens indicating the extreme importance of referring to some surgeon or some pathologist suspicious cases. If in your patient you see a leucoplakia lingualis, or buccalis,—the "wash-leather" appearance which in twenty-five cases out of one hundred results in epithelioma,—or an epulis, or even a small tumor or an ulcer of the tongue, you should advise him to go to a surgeon as early as possible, because then an immense amount of good can be done, but later on perhaps almost nothing.

I now show you, as I showed to the other gentlemen at the clinic, this specimen of a normal upper jaw so sawn that you may look into the antrum from its outside as through a window. Observe that the tiny natural opening is at the juncture of the roof and inner wall, consequently in antrum empyema we have to attack a much lower point in order to get drainage by gravity. The best way is, however, not the old-fashioned one of pulling out a tooth, but instead going in through the bottom of the antrum at the point where its bony wall is thinnest,—*i.e.*, at the region just above the first molar or second bicuspid. The best way to drain, if a tube is to be used, is to turn inside out for the smallest possible distance a soft rubber tube of such size as just to fit the opening you have made. This short collar upon the tubing may be retained in that shape by a stitch. The collar prevents the entire tube slipping in too far, and the lip will prevent it from coming out into the mouth.

Dr. LeRoy. There is one question I would like to ask, and that is about the operation of entering the glottis, or the windpipe, for relief from particles of food having lodged there, causing stoppage of that passage so that the patient was choking to death. In such a case, where there is obstruction of the glottis, can that condition be relieved by opening below it in the manner described this afternoon?

Dr. Dawbarn. Yes. Here is the "Adam's apple," or thyroid cartilage prominence, and we can all note upon our own persons that one inch lower is a small depression capable of admitting the finger-tip. It is in this depression that we make our quick cut, passing at once through the cricothyroid membrane and into the air space, well below the glottis, in which is caught the obstruction,—a thing that every doctor, whether he be a dentist or other specialist, should feel capable of doing to give relief if any person is in his presence threatened with death from food or other foreign body in the larynx. Every year there are numerous deaths, in the aggregate, from this reason. If that happens in the presence of a doctor it is a lasting disgrace. With a penknife and by a single cut relief can be obtained. Having entered, turn the knife at right angles, and the patient can get a long breath; then, holding the finger over the wound, the patient can cough up the obstruction.

Tracheotomy is performed where you have comparative leisure, but laryngotomy where air must be obtained on the instant. Pack a bit of clean handkerchief in the wound to stop oozing, and when the patient gets home you soak some gauze with antiseptic solution and pack it in two or three hours to sterilize the cut, because the wound was made with a penknife and may otherwise become septic; subsequently suture both the divided cricothyroid membrane and the skin.

(In reply to a question.) You can make a diagnosis of a tumor or of pus in the antrum by a little electric light that is used. You put it in the mouth in a dark room; it will shine right through the roof of the mouth, and the resulting appearance of the face reminds one of the pumpkin lantern of childhood. Normally the light passes through both antra, and then the bone and flesh in front, thus producing two large, roughly triangular bright areas, one beneath each orbit. But if one antrum contains a solid growth or a turbid fluid, that side of the face remains dark. In this operation you cannot make a mistake as to finding the lowest point if you go in at any point back of the cuspid teeth, but the nearer the first molar the better as a rule.

(In answer to a question.) I pack in at the time of the operation a long strip of gauze rubbed with aristol. It is one of the best means of checking bleeding of the small vessels. I do not want to spend fifteen or twenty minutes stopping the oozing from the antrum. I leave this gauze in twenty-four hours. There may be a large blood-clot filling the cavity if you do not do that. If you find bare bone (and these are often tubercular cases) you must scrape, and then use dry gauze packing. The aristol gauze is the best in that case. If it is suppurative, but not a tubercular case, I select either daily douching (and use of a short rubber drainage tube) or else a dry gauze packing, changed every other day. The patient soon learns to wash it out for himself with a fountain syringe, but he can less easily do effective gauze packing.

Dr. Jarvie. In the mean time, you leave the drainage tube in all the time?

Dr. Dawbarn. You remove it occasionally to cleanse it, but at once reintroduce; and the tube remains as long as the discharge may show need of it. (In answer to another query.) When the bone is so extremely thin as here, there is no trouble to get through; I have gone through with a simple pair of sharp-pointed scissors.

Dr. Keppy. Does the treatment ever cause inflammation?

Dr. Dawbarn. No; we should use mild antiseptics, of course. If the fountain syringe is hung too high the face will ache from the force; it should be only a few inches above the head. Take a dram of salt to a pint of water, or a tablespoonful to a quart. If instead you use plain water it smarts, and if you use a mild solution of salt water, it does not. After such cleansing we may end by a weak bichloric douche, or one with Thiersch solution (the borosalicylic), or one of boric acid saturated in water. This last, while not a very strong antiseptic, is devoid of any irritant effect.

Dr. Keppy. Have you ever used trichloracetic acid?

Dr. Dawbarn. Not for this purpose. If you use peroxid of hydrogen, be careful with it, for almost all peroxid is strongly acid in reaction, and it smarts. Add, just before using, lime-water or sodium bicarbonate, and test it with litmus paper until neutral in reaction, and you will find it is no longer painful. I neutralize it, and then use it full strength.

Dr. LeRoy. Another point that I would like to have come before the society is the anesthetizing of the incisor teeth by the application of cocain in the nasal cavity. It would be very interesting if Dr. Dawbarn would speak of it now, as he did this afternoon.

Dr. Dawbarn. I would like to say to Dr. Hart that if the officers of his school who did me the courtesy to send those two cases to my hospital care to be present on the 28th inst. at the meeting of the Surgical Society, they will see those cancers of the floor of the mouth and the tongue so shrunken that they would not recognize them.

In answer to Dr. LeRoy, I use cocain a great deal for all sorts of purposes, and have had no unpleasant results from it, because I make it a point to oppose the only unpleasant feature about it,—the contraction of the blood-vessels. If you will exhibit with it, say, one-fiftieth of a grain of glonoin, which you can get in hypodermic tablet triturates, you will have no bad results, unless the patient absorbs at least a grain or so of cocain. Or give the patient a good drink of whiskey; that will dilate the blood-vessels and prevent trouble. There is one other thing that contracts the blood-vessels strikingly,—namely, suprarenal extract. Our Academy of Medicine recently spent a whole evening discussing that drug. You can get it in tablets, and a fresh solution is the best. Break or rub it up, and add it to water nearly boiling, and use it, say, in ten per cent. strength. It will contract the blood-vessels as cocain does, but is not poisonous. If you have a cold in the head and apply it in spray the parts will become anemic and pale, and the turgid vessels will become contracted, and presently you can breathe easily again for a time. It is not a good way to treat a cold in the head, but I merely illustrate that to show you the effect. In nose operations, such as sawing away septal spurs, etc., we first apply pledgets thoroughly soaked with the suprarenal extract of any strength you like; it does not seem to be poisonous; or else spray with it. Then apply cocain, any strength, say ten per cent.; you need not be afraid, because the vessels are so contracted that they will not take up the cocain. By the combined use in this way we make sure, first, of a practically bloodless and, secondly, of a painless operation.

I spoke this afternoon of two ways of anesthetizing, both of which I have used. One is in the case of the four upper incisors; to take a very little absorbent cotton and soak it in a ten per cent. solution of cocain; not wet enough to run down the patient's throat, but simply thoroughly damp, and pack it with the tip of your finger upon the floor of the nose. It will be absorbed by the lymphatics, and will obtund those front teeth. The second way in which dentists may profitably use cocain, or eucain, is to use a weak solution of the former (say, one per cent.; perhaps thirty to fifty minims of it, with glonoin as aforesaid), or a grain or two of the latter (eucain) in ten per cent. solution (it being less anesthetic, also less poisonous), either to be injected through the cheek by a long hypodermic needle, between the zygoma and the sigmoid notch of the lower jaw-bone, with the result, if the injected fluid surrounds and bathes as it should the inferior dental nerve, that all the lower teeth on that half of the jaw will be temporarily obtunded. To do this properly the patient should widely open his mouth first, when you can feel the sigmoid notch rather easily.

Dr. Perry. Do you use the suprarenal extract for greater safety with the cocain, or does it accelerate the effect?

Dr. DAWBARN. For both reasons. It is used especially for certain operations in the interior of the face, which would otherwise be much more bloody ones. You get the same thing from cocain, but with cocain the swelling will all come back, and also to a small extent the bleeding, within twenty minutes or half an hour. But with the suprarenal extract the anemia is of much longer duration, and the cut vessels have time to become well stopped by a firm clot before they dilate again.

Dr. HODSON. If this contraction of the blood-vessels with the use of cocain causes the danger, where is the advantage in using this extract?

Dr. DAWBARN. It does not seem to be poisonous when absorbed, and yet has the same effect where locally applied. The question is a very natural one, but so far there have been no very unpleasant symptoms from using any amount of it; whereas if you use cocain carelessly that is not the case. Still, as to cocain, I repeat that if you use whiskey or a hypodermic injection of glonoin before your cocain you have no danger from it, even when used in doses up to a grain.

Dr. PERRY. What about eucain compared with cocain?

Dr. DAWBARN. I like it very much. It is perhaps five times less poisonous than cocain. You can safely have the patient absorb into the blood as much as three or four grains of it. It has, however, only about one-third of the anesthetic power of cocain, and is of no value in diminishing the amount of bleeding, for it does not contract vessels; yet in one operation that is a distinct advantage. Suppose you have an enlarged tonsil, requiring amputation. Now, if you inject into it cocain solution this will shrink that tonsil to possibly one-half or two-thirds of its former size. The next day after cutting you will be disgusted to see the prominence of the stump; you will be surprised to see how little you have cut off. Now, if eucain is injected instead, the operator is not thus deceived.

There is one thing which I first used two years ago which I think will come ultimately into wide use, and that is bloodless tonsillotomy. When you have an adult to deal with especially, you are apt to have a very ugly degree of bleeding; and if there is some means by which you can remove the tonsil without bleeding, it ought to be regarded as a great advance. There is such a way. You inject the eucain into the tonsil; then take a large semicircular needle armed with strong silk, and pass that through four times just below the surface, thus surrounding the tonsil by a kind of square purse-string suture. With a mouth-gag you can do this very easily. You next tighten and tie this constricting string about the base, and then do the operation bloodlessly. Give the patient some morphin, so as to make him comfortable, and finally cut and remove the silk suture about a day later.

Dr. PERRY. What is this extract of which you spoke a few minutes ago?

Dr. DAWBARN. It comes from the suprarenal gland,—the one lying just above the kidney,—the function of which in the bodily economy we have not well understood. When it is diseased it is known as Addison's disease, or bronze-skin disease, and is considered commonly to be a tubercular trouble. This advance in our therapeutic armament is one of the results of experiments on animals. It is obtained from the sheep and various other animals. I do not know whether the one on the market is most often from sheep, or calves, or beeves.

Dr. W. D. TRACY then read a paper on the "Restoration of a Broken Central Incisor with Porcelain."*

Discussion.

Dr. R. M. SANGER, of East Orange, N. J. The paper of Dr. Tracy is very lucid. The scheme which he described is perfectly practicable, as every porcelain worker knows. I have had no experience at all with the material with which he hardens his cast, and so cannot say anything about that.

Dr. W. J. TURNER. In the case I had the work was all done at the chair. I did not take an impression beforehand, but should think that Dr. Tracy's method of taking an impression and getting a matrix, and doing the first baking of the porcelain when the patient is away, would be a great saving of time and a great convenience to the patient. Dr. Tracy told me some time ago of this method of hardening the plaster models, and it is a most valuable procedure. The matrix can be burnished to the plaster without any danger of destroying the edges. I think the method of making a corner, by taking a piece of porcelain already baked and making the whole inlay of that, is very much better than making the whole thing of the new material. In the case Dr. Jarvie speaks of, which I restored in that way, although the result was not perfect on account of different shadows causing changing colors of the porcelain, it was far superior to what it would have been had it been done with gold.

The PRESIDENT. I would like to ask the gentlemen if, after they have taken the most extreme pains in selecting the proper color and having the inlay beautifully adapted and cemented in, they have had any trouble with the blue color, making the result look like a "black eye"?

Dr. S. G. PERRY. In selecting the color I have the inlay several shades lighter than the tooth, making an allowance for the darkening which will take place. That will not leave so white a line around the inlay as the white cement, which would be necessary to give it the right color. In reference to the use of the plaster model for burnishing the inlay, it certainly is a great saving of time. When the method of making inlays was first introduced I saw the necessity of having something of that kind. I tried oxyphosphate of zinc and did fairly well, but it is pretty hard to get with it a very sharp edge. I have tried the old-fashioned oxychlorid of zinc, which gives a more accurate representation of the cavity than either the oxyphosphate of zinc or the plaster. It requires great care to get a perfect reproduction of the cavity, and then you must wait a long time to let it harden. But it gives an excellent matrix in which to burnish your platinum.

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*Printed in full at page 743 of the current number.

Dr. Sanger. In my experience with large contours I have found the best results in color by taking a piece of porcelain and using that as the basis around which to build the inlay, so that it forms the body of the filling. There is a translucency about the bodies as we bake them, giving you a bad color when the piece is cemented in position. All of you know by experience that you can bake a tip or an inlay so perfect that the eye does not detect it. When you underlay that with an opaque material, such as our cements are, you get a shadow which spoils the appearance of your work. In pieces of porcelain that have been baked to the density of artificial teeth you get an opacity which overcomes the translucency of the bodies as we lay them in the powder and bake them. I am following out a line of experiments which I believe will in a measure overcome this. It is based on the hypothesis that the ordinary continuous-gum body is more opaque than any of the bodies that we get for making porcelain inlays, and with that thought in mind I am pursuing experiments by first making a layer in the matrix of the ordinary continuous-gum body. Over that I am making what you would call an overlay of the shade desired for the inlay, making it a trifle lighter either on a blue or a yellow cast, getting the color in the final baking or the two last bakings. This is only in course of experimentation. Whether my hopes will be sadly dashed when I come to some of those approximal inlays, where you get light from two or three different directions, and looking at it in one light it is beautiful, and from the other direction your heart sinks down to your boots, I am not ready to say.

Dr. B. C. Nash. Some three months ago I had the opportunity of putting a porcelain tip on an upper central,—my first experience,—and I took for the purpose a porcelain facing, grinding it to fit. The facing had two cross-pins, which I measured and marked on the tooth, drilling holes for anchorage. The tip was not more than one-eighth of an inch in depth, covering the entire width of the tooth, and it took me just three hours to fit and finally adjust it with oxyphosphate. I saw the case the other day on the street, and five feet away it could not be distinguished, although the color is not a perfect match. It is darker than the tooth itself, but is much preferable to a gold filling.

Dr. Perry. A couple of years ago a gentleman was sent to me by another dentist with a tooth—a central—fractured some little distance under the gum, so that the tooth was hanging loose, but fairly attached to the gum. The problem was, Could it be attached to the firm end of the root that was left? I drilled a hole through the under side of the tooth in a line with the canal and put in a pivot, putting in first a little cone of red gutta-percha as near the end of the root as I could, warming the pivot and carrying it up to its place. This pivot bound the two parts together firmly. Very soon after that a little abscess appeared on the gum. I had occasion to lance that twice in two years. This morning the gentleman came with such an inflamed and angry-looking condition around the tooth that I said at once that it should come out. He did not want it to come out, and begged me not to remove it; but the conditions were so threatening I said it could not remain. He said it had been so comfortable, and felt so well all the time, that he did not like to have it out. But this afternoon he went to Dr. Hasbrouck, who took out the tooth. The lower part came away from the root, and in attempting to remove the root it split. Here are the three parts. If the tooth had not developed this diseased condition it would probably have lasted him for many years. I would like those three parts to be noticed. My proposition now is to implant a tooth in that socket within a few days' time, not being debarred by the condition that exists. If I do not find a tooth of suitable size or shape I shall attach a new root and implant it, so that he will still have his own crown.

Adjournment.

W. J. Turner, M.D., D.D.S.,
Editor New York Odontological Society.

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

At the annual meeting of the Section on Stomatology of the American Medical Association, held in Atlantic City, N. J., June 5, 1900, the following symposium of papers was presented on the general subject of dental education:

SHOULD THE MEDICAL UNDERGRADUATE BE INSTRUCTED IN THE PRINCIPLES OF DENTISTRY?

BY M. L. RHEIN, M.D., D.D.S., NEW YORK, N. Y.

It is necessary at the outset that the term principles of dentistry as used in this paper should be specifically defined. A requisite knowledge of the shape and uses of the various dental instruments cannot be expected of the general practitioner.

The question at issue then narrows itself down to the advisability of the medical undergraduate being acquainted with principles of dentistry as they bear on general medicine. That the general practitioner should appreciate fully the process of dentition in its relation both to local and constitutional results cannot be denied. Equally as important is it that he should be able to distinguish an incipient alveolar abscess from tic douloureux, simple caries from caries complicated by exposure of the pulp, or the inflammation attending the eruption of a third molar from that caused by follicular tonsillitis. The medical undergraduate should be taught that no tooth need of necessity be lost through the ravages of caries; to judge of the efficacy of remedying these carious defects he must of necessity be able to appreciate whether or not a tooth-cavity has been properly filled. He should be taught to know that more teeth are lost through disease of the peridental membrane than through all other pathological conditions of the mouth combined, and that prophylactic measures tending to preserve this membrane are of vital importance. He should be made cognizant of the intimate relationship existing between the general nutrition and proper mastication, so as to realize when artificial teeth are required, and, if supplied, whether they are properly inserted. Such knowledge implies a proper understanding of the normal occlusion of the upper and lower teeth; it also leads to the appreciation of the value of orthodontia as a corrective for malocclusion.

A proper appreciation of the foregoing facts necessitates that medical undergraduates be taught dental embryology, anatomy, histology, and pathology, in order that these principles should form a foundation for a correct clinical observation of oral conditions. This will enable the general practitioner to serve best both his own interests and the interests of his patients, and at the same time tend to elevate the standing of the dental specialty.

No more opportune time than the present could have been selected for this discussion, for, through the efforts of our medical schools and of our State Board of Medical Examiners, the standard of medical education is advancing yearly. Yet this era of educational progress is utterly ignoring the importance that the principles of dentistry should play in the education of all medical undergraduates. Dental instruction not only is not represented by an individual chair in any of our larger Eastern medical schools, but the teaching of dental principles is not embraced in any of the allied chairs of medical instruction. A medical education which neglects to train the undergraduate in the principles of stomatology is deplorably deficient. Thinking thus, we desire to show not the *modus operandi* by which the medical curriculum should be recast or altered, but rather the disadvantages resulting from the present deficiency in medical training and the advantages to be gained by supplying this deficiency.

Such oversight in the method of medical instruction results in creating a disposition on the part of the general practitioner not only to underestimate the importance of the principles of dentistry, but also to consider the dentist rather as an aid to comfort than as an active and important element in preserving the human economy. The evil results of the medical undergraduate's lack of knowledge of dental principles are all-pervading. On the staff of most of our hospitals it is rare to find the name of a dental specialist, yet only obstinate bigotry may deny the frequent occasions arising in a hospital service that distinctively demand dental treatment.

The poor results that have attended the long-continued agitation for dental representation in the army service well illustrate the poor esteem in which dentists are held by their medical colleagues. All this, too, despite the fact that the recent war demonstrated beyond a doubt that lack of official attention not only worked havoc among the soldiers, but also required the establishment of the sporadic and so-called "dental tents," where emergency dental work was performed by volunteers taken mostly from the ranks.

That ignorance of the principles of stomatology characterizes the general medical practitioner cannot be denied, and as a result of this lack of knowledge his opportunities are greatly handicapped, owing to his inability to appreciate the diagnostic, therapeutic, and prognostic aids afforded by the clinical appearances found in the oral cavity.

As regards the diagnostic aid offered by the mouth, a thorough appreciation of normal appearances is both presupposed and necessary, in order to enable the practitioner to recognize the significance of incipient pathological changes, symptomatic of systemic disease. A red, dry, glazed tongue, characteristically swollen, hemorrhagic gingivæ, and rapid caries of the teeth are frequently the only signs of an incipient diabetes. Likewise, the characteristic whipcord-like tumefaction of the gum over the palatal surface of the teeth is one of the earliest signs of chronic Bright's disease. Similarly in gout, one of the earliest manifestations is the hard, smooth, blackish incrustations of salts found on the roots of the teeth. The peculiar linear discoloration of the gums, found as an accompaniment of metallic intoxication, renders the diagnosis of these sometimes obscure cases both easy and assured. In infantile scorbutus there is no sign of more diagnostic value than the spongy, bleeding, hypertrophied gums, accompanied by an extensive resolution of the infantile tooth-structure. Finally, it may be said with confidence that study and observation of the oral cavity will yield many more invaluable diagnostic points to the seekers of them, and thereby serve to lighten the task of the well-grounded general practitioner.

As regards the aid in therapeusis afforded the general practitioner by the recognition of oral malconditions, it is only necessary to recall the pertinent relationship existing between the many neuroses and caries of the teeth. A few citations will best illustrate this fact. Remedying a carious and irritable tooth has often succeeded in abating the intractable vomiting of pregnancy; in the treatment of chorea attention directed to carious teeth, considered as centers of reflex irritation, has often lessened the severity of the nervous affection. And, finally, how well we know the numerous forms of neuralgia that baffle medical skill until the dentist discovers an exposed pulp and removes it.

As regards the influence of oral conditions on the prognosis of systemic disturbances, we have here a field whose full value is unknown not only to the general practitioner, but also to many dentists. The minute differences in local appearances cannot fail to suggest to the careful observer a proportionate idea of the systemic disturbance, and thus these appearances lead to a much more exact prognosis. At a recent meeting of the Odontological Society of New York I recited the history of a case of miliary pulmonary tuberculosis, in which, with no clinical knowledge of the case, I was yet able to give an absolutely fatal prognosis based on conditions found in the mouth, and verified later, unfortunately, by the course of the disease.

Thus far we have attempted to outline those principles of dentistry the knowledge of which would be of undoubted value to the general practitioner of medicine, and which, therefore, he should learn as a medical student. Not merely from the standpoint of the general practitioner of medicine, however, should this question interest us. As dentists it behooves us not to lose sight of the fact that the education of medical undergraduates in dental principles would serve a double utility. There would result an incalculable gain to the medical man it is true, but it is equally undeniable that the dental profession would also greatly profit by such an educational advancement. The newly-developed ability of the medical man to recognize early pathological conditions of the teeth and mouth would result in more thoroughgoing prophylaxis, and in the earlier application of treatment. Even more than this, the properly educated medical practitioner would recognize innumerable cases of important diseases of the mouth that would otherwise run their insidious course unnoticed and untreated. Granting that early recognition and the early application of treatment were in force, the task of the dental surgeon would thereby be rendered not only less arduous and more satisfactory to himself, but also far less unpleasant to his patients.

Nor is this the only benefit that the dentist would derive from such a change in the medical undergraduates' curriculum. I vouchsafe that there is known to all the members present to-day that class of dentists who, like the proverbially stubborn bird, can work well, but refuse to work well. Good dental work is distinctly time-consuming. There are any number of men eminently fitted to do excellent dental work, and who indeed do accomplish excellent results until they have established a fairly large clientele. Then, suddenly discovering that their rewards are seemingly not commensurate with their labor, and realizing that the discrepancy is due to the time consumed in doing proper work, they sacrifice their ideals. Such a sacrifice is made largely because the dentist realizes that he is the final judge of his own work. He is fully aware of the general practitioner's inability to pass judgment as to whether his patients are receiving intelligent or mediocre treatment. Armed with such knowledge, the unscrupulous dentist is able to continue the nefarious practice of working against time.

I have compared the above class of unscrupulous dentists to the bird that can sing but won't sing. The analogy may be carried farther. The little bird, you know, was made to sing, and likewise the capable dentist can be made to do proper work. Let him realize that Dr. A., who sends him many patients, has graduated from a medical school where dental principles receive merited recognition, and that he therefore values good dental work and discovers faulty results, and the dentist will cease to work against time, and attempt rather to maintain the professional opinion and favor of Dr. A. In this way, then, also the education of the medical undergraduate in dental principles will serve to bring about a much-needed elevation in the standard of the dental specialty.

Still another way remains by which an addition to the burden of the medical student's work would redound to the well-being of both dentist and general practitioner. I refer now to the cultivation of a stronger bond of sympathy between the two branches of practice. Educate the medical man properly, and he will learn to appreciate the dentist at his true worth. The value of the dentist's advice and opinion will be on a par with the advice offered by the ophthalmologist, otologist, or laryngologist. He will be consulted by the general surgeon before a plastic or prosthetic operation is done on the jaws or mouth, and his ideas will be sought by the general practitioner attempting to treat some obscure lesion of the alimentary tract, which might possibly have some connection with oral disease.

Valuable as such a change in medical education would be, and productive of unlimited good, it is nevertheless opposed on various grounds, and for numerous reasons.

First of all we meet the statement that the medical student, above all other professional students, labors most. That the medical undergraduate's lot is an arduous one none of us can gainsay, yet the scope of his work never has and never should be regulated either by his capabilities for strenuous labor or by the amount of time requisite for him to complete his course of study. It must not be imagined that the additional amount of study would be excessive, for it is not the mastery of dental technique that is asked of the medical undergraduate, but merely that he acquaint himself with those oral conditions having a bearing on systemic disease. The problem before him is a simple one, even if it be difficult. His utility to the community depends upon his ability to recognize and alleviate disease; and if a knowledge of dental principles will aid him, as it undoubtedly will, this knowledge must be acquired at whatever cost of additional expenditure of time and labor involved.

This objection disposed of, what can be said to the oft-repeated statement that the testimony afforded by the mouth is at best of only slight corroborative aid to diagnosis? Such a statement is truly absurd. The philosopher's stone was never more assiduously sought than are aids to medical diagnosis. If conditions of the mouth will serve to guide a practitioner properly even in a small number of cases, the knowledge of these conditions should be as assiduously cultivated as are the physical signs of the chest and abdomen. In a very recent brochure on pyorrhea alveolaris Fitzgerald, of London, calls attention to the frequency with which diseases of the gum cause antral empyema, chronic gastritis, phlegmonous gastritis, systemic toxemia, and other infectious diseases, whose early recognition and scientific treatment cannot be divorced from the absolute necessity of recognizing and appreciating the primary focus of disease about the gums. There are those who are in honest accord with us in all that has so far been said, but who believe that, since there is no lack of good dental practitioners, the medical man can always refer his cases to his dental *confrère,* and thus conscientiously avoid the disagreeable duty of himself mastering the principles of dentistry. Such a statement, however, is one of the strongest arguments in favor of our proposition. In the first place, the medical practitioner of to-day is incapable of judging whether or not a particular man is an efficient dentist, and, secondly, he is oftentimes equally incapable of discovering early pathological conditions due to oral disease and requiring simple dental treatment in order to effect a cure. We do not deny the existence of innumerable dentists capable of aiding the general practitioner, but we do affirm the general practitioner's lack of proper appreciation of the scope of these dentists and their work in remedying systemic disease.

In conclusion, let it be noted that the mouth and teeth are as much an integral part of the human economy as are the eyes, ears, larynx, or genito-urinary apparatus. The interdependence of systemic diseases and of diseases of the oral cavity is as close as that between the body and any other of its functioning organs, and therefore the general practitioner is in duty bound to acquaint himself with the appearances of the normal and abnormal oral cavity. The seemingly complete separation of stomatology from general practice, in existence in the country to-day, is a result of the failure of medical men of sixty years ago to appreciate the importance of dental principles. What we are striving for to-day is the closure of this gap, and the only feasible way to accomplish it is to acquaint the medical undergraduate with the important bearing that a study of the mouth has upon the application of the general principles of medicine. Our thesis is to emphasize the fact that in knowledge lies power, and that the resulting power is always commensurate with the comprehensiveness of the knowledge. That this knowledge need not be all-embracing, we have tried to point out by distinctly limiting the term dental principles, but that it would be of unqualified value we have also tried to show by pointing out the advantages to be gained from acquiring such knowledge. There would result the necessary feeling of sympathy between dentist and general practitioner; the general practitioner's work would be of a higher standard; the dentist's work would be more satisfactory, and, lastly, and most important, the patient would be better served. These results are truly to be hoped for. Although it is true that the medical profession contains men who, by a self-imposed duty of study and observation after graduation, have rendered themselves capable of recognizing and properly appreciating diseased conditions in the mouth, yet such men form a glittering minority. We firmly believe that the only way of increasing the number of this conscientious minority is by instructing the medical undergraduate in those principles of stomatology which will make of him a truly broad general practitioner.

HANDWRITING UPON THE WALL: WHAT DOES IT PORTRAY?

BY A. E. BALDWIN, M.D., D.D.S., LL.B., CHICAGO, ILL.

The founders of American dentistry had high professional ideals. The methods of practice at their command were the most crude, and almost, if not wholly, mechanical. They deemed the specialty a part of the healing art, and hence a department of the science of medicine. Such profound regard had early practitioners of dentistry for their calling that in almost every instance before or after they had begun practice they took up the study of general medicine.

They were capable of practicing, and did practice general medicine. The illustrious Hayden, Randall, Jeffries, and many others were graduates of the best American and foreign medical colleges. Later, from 1810 to 1840, at the time of the establishment of the Baltimore College of Dental Surgery, a long list of medically educated men gave honor and dignity to their special calling. These men were the peers of any in the practice of medicine. I doubt if there has ever been a period in our history when such a large percentage of cultured gentlemen graced the dental specialty. They were men of dignity and standing; men of affluence, holding the respect of the people in the community in which they lived.

The foundation of a dental college in 1840 and the creation of a degree divorcing dentistry from medicine marks the period of the narrowing of our calling. No matter what the views of others may be, the motto of our country, "United we stand, divided we fall," is just as applicable to dentistry as in national affairs. The dental student and but too often his teacher have forsaken the broad principles of medicine, and have dwarfed teaching physiology, pathology, and treatment of the human tooth into mere side issues to extraction and insertion of artificial dentures, crown- and bridge-work. A single attendance upon dental societies and slight perusal of dental journals suffices to show the exceedingly narrow lines into which the profession has drifted. Scarcely a dental journal is issued in which the handwriting is not noticed upon the wall. Indeed, outside of filling cavities and roots of teeth, and other mechanical operations, the profession is almost at sea. Multitudes of instances might be quoted from current dental literature, but the few following will suffice.

A paper was read recently before the New York Institute of Stomatology upon "Pyorrhea Alveolaris from a Bacteriological Standpoint, with a Report of some Investigations and Remarks on the Treatment," which was worth neither the paper it was written upon nor the time lost in its reading. Experiments familiar to mere tyros in bacteriology were cited *ad nauseam.* The following item of pathologic absurdity resulted as to the test of germ infection. Rabbits were infected. "All were made sick; some were sicker than others; an abscess formed in one." The fact that the reader knew nothing of the all-important law of Koch as to diagnosis of the pathogenic activity of bacteria did not prevent the flower of the dental profession from considering the paper of such scientific importance as to require discussion. The bacteriologic ignorance in the omission of Koch's law should have prevented its serious consideration by a medical society.

A professor in a Western school, commenting upon a recent article, "Interstitial Gingivitis due to Auto-intoxication,"* remarks, "I cannot agree with the author as to the folly of local treatment. *The cases have grown to large proportions in my hands where local treatment has effected a cure;* in fact, I feel so sure of this that I cannot reconcile my experience with his positive conclusions."

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*International Dental Journal, February, 1900.

Can it be seriously assumed that dentistry is so far ahead of the mother profession as to cure constitutional diseases by local treatment?

In August, 1894, in a paper read at the meeting of the American Dental Association, held at Old Point Comfort, Va., the following method of classification of the different forms of so-called pyorrhea alveolaris was read:

"This classification is made by simply prefixing to pyorrhea an adjective, stating the name of the disease which is causing the pathological symptoms in the oral cavity, as 'gouty pyorrhea,' 'diabetic pyorrhea,' etc. It is unnecessary to enumerate the subdivisions that might be listed, as they embrace all causes that may disarrange nutrition." With all the admittedly valuable data of the paper, its author ignored the simple fact that bacterial infection implied a suitable culture-medium only. So far as the established infection present in pyorrhea was concerned, that culture-medium might be resultant on any auto-intoxication due to these diseases or not. For purposes of clinical study and treatment, the pre-pyorrheic stages were all-important. The complexity of the proposed classification would destroy its value for clinical purposes.

In a certain city dentists were urged to form a society to furnish money to enable a brother dentist to make scientific researches upon bacteriology in relation to so-called pyorrhea alveolaris. This dentist was an amateur in microscopy, who knew almost nothing as to what had already been done in dental bacteriology (the same was true of those who were to furnish the funds), and nearly as little as to bacteriologic laws. He was a man of fair education, but it would have required years to have fitted him to undertake expert work. Would a business man who required an accurate analysis of a certain spring or of composition of drugs or of adulterated foods employ an individual who had yet to be trained as analyst? Fortunately for those who were to furnish the money and who expected results, the scheme fell through. This scheme illustrates excellently the unscientific conception of dentistry held by many well-meaning dentists.

Under the heading "Etiology of Pyorrhea Alveolaris"* an attempt is made to determine the etiology of a disease by the examination of three cases of deposits about the roots of teeth, made by a chemical expert and six or eight by Professor —— in my presence, the results obtained corresponding to those of Professor ——." How much weight would such experiments have in a scientific body?

Some years ago the Faculties Association formed a species of trust, and appointed professors to write text-books to be used in the colleges. These honors were parceled at random on stockholding principles, regardless of ability or qualification. As might have been expected, the books published, except in one or two instances, are not a credit either to the author or the profession. Almost all are uncritical compends of a limited field of dental litera-

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**International Dental Journal,* January, 1894.

ture. A notable example in this particular is a puerile work on "Orthodontia." Here is a work without a single original idea; a hazy compilation of other men's thoughts reduced to a level of the teacher's capacity and the requirements of the students. The author's mind proved unequal to the task of comprehending works already extant and held in high esteem for their scientific basis. Yet this man was supposed to teach science.

A professor on theory and practice in a dental school recently, speaking of so-called pyorrhea alveolaris, said, "I would advise you to read the views of both Drs. Rhein and Talbot, and choose for yourself which theory is correct." This reminds one of the difficulty Lord Timothy Dexter had on punctuation. Lord Timothy gained a fortune by sending warming pans to Africa. He wrote a book, but gave up the problem of punctuation in despair, placing at its end all the punctuation marks, so that the reader might "pepper and salt to suit himself." The task of scientific analysis was similarly too much for our professor.

In a discussion of prosthesis and orthodontia before the Columbian Dental Congress another professor remarked, "I am particularly interested in the correction of irregularities of the teeth, and I find that the etiology has very little to do with the correction. I find I can correct almost any case of irregularity, regardless of the cause." Can it be that dental science has reached such a stage of perfection that disease can be eradicated without the knowledge of cause? This seems strange when it is remembered that the entire trend of medical thought and energy is directed toward the etiology of disease.

In the discussion of a paper on "Degeneracy in its Relation to Deformities of the Jaws and Irregularities of the Teeth," read before the Odontographic Society, another professor said, "The subject is an interesting one, but it is one of to-morrow rather than of to-day. Our knowledge of these facts is not sufficiently advanced to form positive data upon which to base certain opinions, and I am sure that the subject will not, under such circumstances, appeal to the members present as something perhaps of another thing would."

The first paper upon the subject of irregularities of the teeth was published in 1794. Is it possible that the profession has made no progress in the study of the etiology of irregularities of the teeth during the past century? From such remarks by a teacher in two dental colleges, and from the further fact that there was no more discussion of the subject, the inference seems plain that the profession knows nothing about one of the most important questions in its specialty.

Discussing Dr. Frederick Peterson's paper, read before the New York Odontological Society, upon "Deformities of the Hard Palate in Degenerates," one dentist remarked, "I feel just a little foolish to-night, because I have brought with me a case full of models that seem to me to be rather out of place. I labored under a misconception of the subject. I understood that it was to be a discussion on cleft palate in its relation to degeneracy, and when I was asked by the chairman of the Executive Committee to bring some models with me I agreed to do so. There is one point I would now make in connection with the models, and that is, while they are exceedingly abnormal mouths, they are casts from normal people. The patients are not degenerates in any sense of the word, so far as I know."*

This is, as the newspapers say, very important if true, since congenital cleft palates are generally regarded as most marked expressions of degeneracy.

The following reply was sent to Dr. Vernon Hall in response to a letter as to the use of his "Chemistry and Metallurgy applied to Dentistry":

> "*Dear Sir,*—Pardon us for not replying to your favor of recent date, but we have been so exceedingly busy with the college rush. We regret now to say that your work on metallurgy did not meet with very much approval, for the reason that the professors, here, seem to be stuck on Hodgen of San Francisco, Cal., and claim there is more chemistry than is practical for students' use, in your work; and we were very much disappointed at the reception your work received."

A bill is now before Congress for the appointment of dentists in the army and navy. A mail report from General Otis contains an alarming statement regarding the condition of the teeth and jaws of the troops in the Philippines. In General Otis's mail report the case of Walter Fitzgerald, Company C, Twenty-eighth Infantry, formerly of the Montana Volunteers, is cited. This young man, twenty-three years old, has been in the Philippines for a year and seven months. He was one of the first volunteers to reach Manila after Dewey's victory. Nineteen months in the tropics, subsisting on the rations of the army, have resulted in the loss of nearly every tooth in his mouth. It is not the climate alone which is responsible. It is that which undermines the roots of the teeth, while the tropical fever, which has afflicted nearly every volunteer now in the islands, affects the gums of the mouth and loosens the teeth. (Grinding on army biscuits and canned beef doesn't naturally improve the teeth.) In the case of Fitzgerald the teeth did not decay, but they dropped out one by one. This is a common ailment in the Philippines, and the cause generally is the fever. The hospital surgeons are able to relieve the condition of the patient to some extent, but constant care after the fever is necessary to save the teeth.

If this bill should pass and become a law, how many dentists are there who are capable of coping with such conditions as mentioned above? To be sure, the dentist might look wise and plug the cavities in these teeth.

An editorial review of a work upon "Interstitial Gingivitis" claims, "To say that gingivitis in the dog and sheep resembles or is analogous to the lesions found in man calls for a very broad imagination. . . . The environments of man are so totally different from those of street or pound dogs or domesticated sheep or guinea pigs that we must consider this otherwise excellent work as failing to throw much light on the etiology or pathology of interstitial gingivitis."† This review speaks for itself. In the light of the

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**International Dental Journal,* December, 1895, page 755.

†*Dental Review,* October 15, 1899.

great advance in medicine during the past two decades through biologic experiments, such an editorial seems an emanation from a Rip Van Winkle who has remained asleep from the days of fetichism suddenly to awaken in the closing years of the nineteenth century and to insist that not he but the world had been asleep.

Many more illustrations could be added, since the dental journals of the past year are replete with such ignorance; still a sufficient number have been cited to demonstrate the need of a broader education. Until this is acquired no advancement can be made along the lines of original research, and no progress can be made. The handwriting upon the wall marks the standard of the profession.

TECHNICAL *VS.* THEORETIC TRAINING.

BY JOHN S. MARSHALL, M.D., CHICAGO, ILL.

Technics or technical training, as it is generally understood to-day, was not a realized fact ten years ago. At that time the system was still in the embryo stage. The idea was in the minds of a few progressive men, who realized the great need of more careful training in the manipulative departments of dental surgery, but it was as yet undeveloped. Little by little a system has been evolved which covers the entire field of mechanical and operative dentistry, so that to-day in our best institutions it would be difficult to plan a more thorough course of instruction in these departments.

The difficulty, however, lies in the fact that so much time is being spent in the manipulative training of the student that his scientific education is being neglected, and, instead of making scientific practitioners out of our students, we are training them largely as mechanics and artisans. Do not misunderstand me, however, upon this latter point, for I would not have his technical training made any the less thorough or complete than it is to-day, for manipulative skill of the very highest order is required in the first-class dental surgeon. But he needs much more than this if he is to intelligently meet the grave responsibilities of his calling. The health of his patient, and often life and death, wait upon his decision in the treatment of many forms of dental and oral diseases. Is it not, therefore, of vital importance that he should be well grounded in all of those scientific departments of study, taught by the most improved laboratory and clinical methods, that are the foundation of a broad medical education,—viz, anatomy, physiology, histology, pathology, chemistry, materia medica, therapeutics, and surgery? How can he recognize morbid conditions if he knows little or nothing of the normal appearance of tissues or of the physiologic functions of the various organs, parts, and systems of the body, and their mutual interdependence upon each other?

How can he hope to successfully treat even the ordinary forms of disease which belong to his specialty if he is deficient in the knowledge of general and surgical pathology, or of the administration of remedies and their therapeutic effects? If he does not possess this knowledge, his practice must of necessity be empirical.

What the profession needs to-day is not less technic, but a more thorough training in those sciences which make the intelligent physician and surgeon.

The question which very naturally arises in the consideration of this subject, provided that you agree with me that this training in the general medical sciences is necessary, is how it may be accomplished.

For the present I would suggest, first, to so elevate the entrance requirements that only the most intelligent and studious can hope to gain admission to the dental colleges.

Second. By lengthening the present dental college course to four years, of nine months each. This would give ample time for the most thorough training.

Third. By placing the dental students in the same classes with the medical students for the first two years of the course of study, and require them to take the same work and pass the same examinations; and during the last two years devote all the time to those subjects which pertain to dental surgery.

Fourth. Graduate no student who has not fulfilled all of the requirements of the course.

The scientific or foundation studies of the medical and dental curriculum might, however, be taught in our universities, because these subjects are a part of a university education, and can be taught with more thoroughness and with less expense by these institutions than by separate professional schools.

Our young men should be encouraged to take a thorough course of instruction in medicine and surgery before entering upon the technical training of the dental college course, for the writer believes that this is the only way in which a truly scientific dental surgeon can be made. If the foundation of scientific knowledge is not laid during the college course, it is very rarely obtained afterward; while, on the other hand, superior technical skill may be obtained after graduation, as the very nature of the every-day occupation of the dentist tends to perfect him in manipulative technique. Young men equipped with a good medical education should be permitted to enter the senior class in a three-year dental course, and the junior year in a four-year course. As it is now arranged, the medical graduate is allowed but one year in the dental course for all of his scientific work in the medical sciences. This works a hardship upon the ambitious and energetic student, and is also detrimental to the best interests of the profession by placing a premium upon ignorance instead of upon scientific attainments. This keeps out of the profession a class of young men who would become its brightest ornaments, and gradually uplift the whole profession to a higher plane of scientific attainment.

But then the commercial spirit again comes to the front, and says such a movement would ruin our schools. If such schools were organized for the purpose of *just making money*, then the sooner they disappear the better. There are already too many schools in existence, and only the better ones should live.

If dental surgery is a department of medicine, then let it place itself upon the same plane with the other specialties of medicine. If it is a learned profession and separate from medicine, then let it place itself upon the same plane with the other learned professions. But it can only do so by adopting the same high standards of culture, professional attainments, and ethics.

IS MEDICAL EDUCATION A NECESSARY QUALIFICATION FOR DENTAL PRACTICE?

BY R. R. ANDREWS, D.D.S., CAMBRIDGE, MASS.

At the dental section meeting of the American Medical Association in Baltimore some years ago, while speaking on the subject of dental education, I strongly advocated the formation of a medical university; an institution that should educate men in medicine, and have all the chairs necessary to thoroughly teach any specialty that the student may elect. That there should be taught those principles which should give to each of its graduates the old and honored degree M.D. I can conceive of no reason why this idea might not become a reality in the presence of a noble enthusiasm for real progress. So far as I am aware, dentistry is the only specialty having separate schools and giving a separate special degree. Dr. Chapin A. Harris, the father of American dentistry, who realized that the dentist should be medically educated, endeavored to establish a professorship of dental surgery in the medical department of the University of Maryland. The authorities of the university, not having a very exalted opinion of dentistry as it existed at that time, would not agree to this, and Harris with his friends founded the Baltimore College of Dentistry.

This was the reason for its separation. Can we rectify this mistake? Does the oculist, the aurist, or the dermatologist have any better claim to be known in medicine as a specialist than the dentist? A decided advance in educational matters lies in the fact that our professional schools are demanding as an entrance condition that men who are to become scientists, physicians, lawyers, or clergymen must have received a degree in letters from one of the recognized colleges. The high standard of our professional schools demands this. Is there any reason why we should not demand as much from the man who is to become a dentist? I do not believe that there is an independent dental school in existence that could exist if the requirements for entrance were a degree of letters. Let the few men who have such qualifications take the medical education, and thus take a higher stand.

I believe that it was lack of ethical and professional training in the past that is largely responsible for the perverters of our profession. I am not unmindful of the great work that our dental colleges of the better class have done, or of the wonderful progress that dentistry has made under them. And this, I believe, is the very thing which is leading up to what we advocate, the necessity for the old and honored degree of Doctor of Medicine. This degree would give to the dentist a broader education; would improve his social and professional status, and would give a large and general knowledge of the scientific principles involved. Then the mental training which would result from such a course in the higher qualifications must be of vast service to him in his practice in after-life. It has been argued that we are likely to lose our manual skill attending to studies so largely theoretical, but do we forget how much practical work is required for a degree in medicine? In physiology, chemistry, and physics, and at the dissecting table one gains a very large amount of manual skill, and also gains a very decided mental training which must result in a distinct advance when taken with the full special technical training of his chosen profession.

The demand of the time is for a higher standard. The salvation of our profession is to be achieved through higher educational attainment. In the highest sense, dentistry is a specialty in medicine, and more time should be given in our special training to dealing with the abstruse problems in medicine whose actions have remote influences on the mouth and its diseases. We are now in a position to demand a higher standard, and the question comes to us, How can we better our profession in ethical and professional ways?

To me there is no question as to the desirability of the establishment of our profession on a medical basis. There will be opposition, but we must work to overcome it. The problem of medical education for a dentist is too pregnant with possibilities to act lightly; we must give it full and deep thought and discussion, and then act for the true interests of our profession. A change must come; if not this year, then the next, or the next. The question fronts us whether we shall be a profession or a business. What is our remedy? Our leaders are thinking; as a result our dental schools are fast becoming allied to universities having medical departments. The trend of dental education is certainly toward the medical, and the tone from the graduate of these schools is more ethical. Here, it seems to me, lies our chance. We must give an ethical, professional, and technical education to the average graduate. We cannot advance a profession faster than its average graduates. Let us urge the educators of universities to blend the dental with the medical, adding such chairs in the special dental courses as shall give complete technical training. I myself have no doubt but that this is coming, and present indications confirm my belief.

Harvard University is preparing to erect a medical university, and will take in under one care all of its medical specialties, including the dental. With the proper application of influence we may look for the same degree which is now given to the oculist, the aurist, the surgeon, and the dermatologist. Can this be brought about? In answer let me quote a sentiment from Dr. J. Leon Williams in his paper, "Which Shall it be, the Empirical or the Scientific Method?": "Anything can be that has the support of twelve or even six men . . . who have faith in themselves. It would be highly gratifying to me if these six wise and earnest men could be found in this society. The influence of this organization is world-wide, and it contains men of sufficient executive ability to carry this or almost any other movement into which they put their whole hearts to a successful issue."

IS A MEDICAL EDUCATION A NECESSARY QUALIFICATION FOR DENTAL PRACTICE?

BY ALICE M. STEEVES, D.D.S., CHICAGO, ILL.

In this age of strenuous activity and rapid advancement, when personal gain often seems to be the sole object of professional work, the necessity for a medical education in dental practice may be denied by the narrow-minded in either profession. The development of specialties in recent years has created a spirit of commercialism in which completeness of education is neglected, and only those studies acquired that can be quickly turned to money. In no specialty has this tendency been more marked than in dentistry. If concentration of energy and study makes the successful specialist on all medical lines, may not the dentist claim an added opportunity for even greater ability because of the mechanical skill required in his work?

The way upward in dentistry, not unlike all other professional paths of to-day, through cheap competition and unethical practice, is hard enough at best, and requires the use of every possible resource.

Dental science originated in the medical profession, and, although not permitted to become a part of the mother profession in the beginning, it is recognized to-day as a specialty of medicine; and justly so, for there is no more reason for making a distinct profession of dentistry than surgery, neurology, or ophthalmology. On the one hand it is claimed that dental success consists merely in the production of a skillful result from a mechanical standpoint, while on the other hand we hold that a dental education has the broadest possible significance, and includes a knowledge of the structure and function of organs not only of the mouth, but of the whole organism and the principles of disease as well.

The dentist should receive the same preliminary education as the medical specialist, because, in so far as dentistry is more than a mechanical art, it depends on the same sources and requires the same studies as all other departments of medicine and surgery. The principles of disease processes are the same, whether they occur in the internal organs, the extremities, or in the teeth, while the anatomy, physiology, and chemistry of the organs of the mouth are the same as of other structures elsewhere. A knowledge of the elementary principles of one set of organs requires the same studies as any other group of organs in the body. The necessity for more complete pathological training becomes apparent whenever the dentist attempts to treat diseased conditions of the mouth. It is not enough to remove or advise the removal of the cause of disease, unless we can make a logical diagnosis as to the cause and be able to predict its probable outcome.

The surgical principles do not differ from those in other surgical practice. The laws of aseptic and antiseptic treatment are just as applicable to dentistry as to amputations, because the inflammation which produces an alveolar abscess is the same process which follows septic infection anywhere. The dependence of one set of conditions upon other conditions at distant parts of the body must be recognized. One of the simplest, yet greatest, examples is the perfect assimilation of food, possible only through normal conditions in the mouth.

There is a common interest between the dentist and other medical specialties. The dentist must be familiar with the structure and function of other organs than those of the mouth, while the medical man should be able to recognize the presence of diseased conditions in the mouth and their relation to morbid changes elsewhere.

Medical and dental students should be educated in the same schools, because the fundamental studies which each must pursue are the same, only requiring different clinical and laboratory instruction for advanced courses in their separate specialties. By this combination we would secure the advantages of larger institutions, more fully equipped laboratories, better clinical facilities and instruction by the best specialists in each department, while the broader scientific atmosphere would create a healthful competition between students of both branches.

If the position of the dental specialist shall equal in dignity and importance the foremost in medicine, it will be necessary to educate and train the dentist more thoroughly in the fundamental principles of medical and surgical science. The advantages of united work in this association are many, and he who will grow must avail himself of these meetings. The obstetrician's paper will help us to care for the mother during the period of gestation; the neurologist's paper will aid in the management of neurasthenic and nervous patients, which is so often a difficult problem, while the surgeon's paper will assist us because we are surgeons.

I have given but few of the many reasons why the physician and the dentist belong to the same great profession, must work with the same methods, study the same principles; and the dental student may well spend one-half or three-fifths of his time in securing a thorough groundwork in the laws of the medical profession.

(To be continued.)

NATIONAL DENTAL ASSOCIATION.

THE National Dental Association held its fourth annual meeting in the assembly room of the Chamberlin Hotel, Old Point Comfort, Va., beginning Tuesday, July 10, 1900. The following were elected officers for the ensuing year: G. V. Black, Chicago, president; E. S. Gaylord, New Haven, Conn., vice-president for the East; T. W. Brophy, Chicago, vice-president for the West; M. F. Finley, Washington, D. C., vice-president for the South; A. H. Peck, Chicago, recording secretary; Mary E. Gallup, Boston, corresponding secretary; Henry W. Morgan, Nashville, treasurer; C. N. Johnson, Chicago, V. H. Jackson, New York, and T. P. Hinman, Atlanta, members of Executive Committee for three years; H. J. Burkhart, Batavia, N. Y., J. Y. Crawford, Nashville, Thos. Fillebrown, Boston, W. E. Griswold, Denver, and B. Holly Smith, Baltimore, Executive Council.

Milwaukee was selected as the place for the annual meeting of 1901.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE National Association of Dental Examiners held its seventeenth annual session at the Hotel Hygeia, Old Point Comfort, Va., commencing Friday, July 13, 1900. The following were elected officers for the ensuing year: V. E. Turner, Raleigh, N. C., president; J. E. Dowsley, Boston, vice-president; Charles A. Meeker, Newark, N. J., secretary-treasurer; C. C. Chittenden (chairman), Madison, Wis., J. A. Hall, Collinsville, Ala., M. F. Finley, Washington, D. C., committee on colleges.

SOUTHERN DENTAL ASSOCIATION—BRANCH OF THE NATIONAL DENTAL ASSOCIATION.

A CALLED meeting of the members of the Southern Dental Association—Branch of the National Dental Association—was held at Old Point Comfort, Va., Wednesday, July 11, 1900, for the purpose of selecting the next place of meeting; President Hinman in the chair.

Lookout Mountain, Tenn., was chosen, and the time was left to be decided by the Executive Committee.

After authorizing the treasurer to pay all duly authenticated bills, the called meeting adjourned.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE seventeenth annual meeting of the National Association of Dental Faculties was held at the Hotel Hygeia, Old Point Comfort, Va., commencing Friday, July 13, 1900. The following were elected officers for the ensuing year: B. Holly Smith, Baltimore, president; Wilbur F. Litch, Philadelphia, vice-president; J. H. Kennerly, St. Louis, secretary; Henry W. Morgan, Nashville, treasurer; S. W. Foster, Atlanta, J. B. Willmott, Toronto, H. B. Tileston, Louisville (two years), John I. Hart, New York (two years), D. J. McMillen, Kansas City, Executive Committee; J. D. Patterson, Kansas City, W. T. McLean, Cincinnati, G. V. I. Brown, Milwaukee, *ad interim* committee; A. O. Hunt, Omaha, Henry W. Morgan, Nashville, W. E. Walker, Pass Christian, Miss., law committee. The appointive committees are to be filled later.

HARVARD DENTAL ALUMNI ASSOCIATION.

The fourth annual alumni day was held on Monday, June 25, 1900, at the school building in Boston. Clinics and demonstration were given, and the work of the three classes for the past year shown. Aside from patients there were one hundred and fifty-one persons present. Essays were read by several professors and instructors of the school.

The twenty-ninth annual banquet was held as usual at Young's Hotel in the evening, with one hundred and seven individuals seated at the tables. The guests of the evening were Mr. Booker T. Washington, principal of the Tuskegee Normal and Industrial Institute, of Tuskegee, Alabama, and Mr. Roscoe Conkling Bruce, of Mississippi. Other speakers were Dean Eugene H. Smith, Professor Thomas Fillebrown, Dr. L. D. Shepard, all of Boston, and Mr. Charles W. Rodgers, of the class of 1900.

The following were elected officers for the ensuing year: Cecil P. Wilson, '72, Boston, president; Henry W. Gillett, '85, Newport, R. I., vice-president; Waldo E. Boardman, '86, Boston, secretary; Harry S. Parsons, '92, Boston, treasurer; Waldo E. Boardman, '86, William P. Cooke, '81, Patrick W. Moriarty, '89, Executive Committee. WALDO E. BOARDMAN, *Secretary.*

CONNECTICUT STATE DENTAL ASSOCIATION.

THE annual meeting of the Connecticut State Dental Association was held at Hartford, May 15 and 16, 1900.

Among those who took part in the program were Professor M. H. Cryer, of Philadelphia; Dr. D. Hurlbut Allis, of Springfield, and Dr. C. Frank Bliven, of Worcester, Mass.

Eighteen new members were elected.

The next annual meeting will be held in Hartford, May 21 and 22, 1901, and the officers and committees intend that it shall be the greatest meeting in the history of the association.

Officers were elected as follows: Dr. A. C. Fones, Bridgeport, president; Dr. Henry McManus, Hartford, vice-president; Dr. Edward Eberle, 68 Pratt street, Hartford, secretary; Dr. E. B. Griffith, Bridgeport, treasurer. Executive Committee, Drs. F. T. Murlless, Jr., Windsor Locks (chairman); Geo. O. McLean, Hartford; E. B. Abbey, Hartford.

Dr. C. C. Prentiss, of Hartford, was appointed assistant secretary.

Dr. C. Frank Bliven, of Worcester, was elected an honorary member. EDWARD EBERLE, *Secretary.*

TENNESSEE DENTAL ASSOCIATION.

THE thirty-third annual meeting of the Tennessee Dental Association was held at Raleigh Inn, near Memphis, May 8-10, 1900; President A. R. Melendy presiding.

The program was an exceptionally good one, and reflected much credit on the committee in charge of it. Several very interesting papers were read and discussed. The clinics were unusually good. Sixteen new members were added to the roll. Three had been removed by death,—viz, Dr. W. T. Arrington, of Memphis; Dr. W. D. Taylor, of Brownville, and Dr. G. S. Pearcy, of Jackson.

The following officers were chosen for the ensuing year,—viz: W. M. Slack, Memphis, president; J. A. Dale, Nashville, first vice-president; Southall Dixon, Bolivar, second vice-president; A. Sidney Page, Columbia, recording secretary; A. R. Melendy, Knoxville, corresponding secretary. Executive Committee, A. R. Melendy, Knoxville, for East Tennessee; J. T. Meadors, Columbia, for Middle Tennessee; J. W. Peete, Memphis, for West Tennessee.

Monteagle was chosen as the next place of meeting, and the first Tuesday in July, 1901, was the date selected.

A. SIDNEY PAGE, *Secretary.*

GEORGIA STATE DENTAL SOCIETY.

AT the meeting of the Georgia State Dental Society, held at Cumberland Island, June 12 to 15, 1900, the following officers were elected for the ensuing year: Dr. W. H. Weaver, La Grange, president; Dr. H. H. Johnson, Macon, first vice-president; Dr. A. M. Jackson, Milledgeville, second vice-president; Dr. H. A. Lowrance, Athens, treasurer; Dr. S. H. McKee, Americus, recording secretary; Dr. O. H. McDonald, Atlanta, corresponding secretary. Executive Committee, Drs. E. A. Figner (chairman), Milledgeville; J. C. Brewer, Blackshear; S. W. Foster, Atlanta; C. P. Davis, Americus; J. W. Maning, Milledgeville. Editor *Dental World,* Dr. Thos. P. Hinman, Atlanta; associate editor and business manager, Dr. O. H. McDonald, Atlanta. Delegates to National Association, Drs. H. S. Colding, Savannah; O. H. McDonald, Atlanta; Ed. A. Tigner, Milledgeville; M. N. Mixon, Rome; A. G. Bouton, Savannah; M. E. Turner, Atlanta; W. A. Summerlin, Mt. Vernon.

O. H. McDONALD, *Cor. Sec'y.*

COLORADO STATE DENTAL ASSOCIATION.

AT the annual meeting of the Colorado State Dental Association, held at Boulder, Col., June 12, 13, and 14, 1900, the following officers were elected for the ensuing year: E. R. Warner, president, Denver; J. Allen Smith, vice-president, Colorado Springs; H. F. Hoffman, secretary, Denver; William Smedley, treasurer, Denver.

H. F. HOFFMAN, *Sec'y.*

DENTAL COLLEGE COMMENCEMENTS.

COLLEGE OF PHYSICIANS AND SURGEONS, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the College of Physicians and Surgeons were held in the Grand Opera House, Atlanta, Ga., on Monday, April 30, 1900.

The number of matriculates for the session was eighty.

The degree of D.D.S. was conferred on the following graduates by Judge Howard Van Epps, president of the Board of Trustees:

A. N. Bowers	Georgia.
W. J. Beck	Alabama.
O. J. Bender	North Carolina.
T. B. Collins	Georgia.
G. W. Fickling	Georgia.
C. A. Hopkins	Georgia.
L. H. Helms	Alabama.
J. P. Henry	Louisiana.
W. S. Irvin	Florida.
H. J. Pratt	Georgia.
W. M. Slaughter	Georgia.
D. C. Shepherd	Georgia.
C. Whittington	Georgia.
W. C. Wall	Georgia.
W. D. Wells	Georgia.
D. F. White	Georgia.
W. M. Zirkle	Georgia.

HARVARD DENTAL SCHOOL.

THE annual commencement exercises of the Harvard Dental School were held in Sanders Theater, Cambridge, Mass., on Wednesday, June 27, 1900.

The number of matriculates for the session was one hundred and thirty-one.

The degree of D.M.D. was conferred on the following graduates by President Eliot:

D. C. Brown	Virginia.
Geo. E. Barrell	Maine.
Geo. O. Bartlett	Massachusetts.
H. S. Burton, L.D.S.	England.
S. F. Carrier	Massachusetts.
H. A. Davis, Ph.B.	Massachusetts.
F. W. Day	Maine.
Louis D. H. Fuller	Massachusetts.
C. M. Glazier	Massachusetts.
D. J. Hurley	Massachusetts.
Chas. A. Jameson	Massachusetts.
E. N. Kent	Massachusetts.
Jos. Lecomte, M.D.	Belgium.
C. B. Leighton	Maine.
D. C. Martin	Massachusetts.
Chas. W. McPherson	Massachusetts.
Wm. W. Marvel, Jr.	Rhode Island.
A. I. Mackintosh	Massachusetts.
L. H. Naylor	Massachusetts.
F. D. Pierce	Massachusetts.
R. W. Payne	Massachusetts.
Jos. E. Rochette	Massachusetts.
S. L. D. Randall	Massachusetts.
C. W. Rodgers	New York.
John W. Ryan	Massachusetts.
Frank W. Snow	Rhode Island.
D. F. Spinney	Massachusetts.
N. G. Trueman	Massachusetts.
John A. Watts	Canada.

The degree of D.M.D. *cum laude* was conferred on the following:

J. W. Estabrooks	Massachusetts.
Geo. C. Baldwin	California.
Jno. I. Esgate	Massachusetts.
H. H. Simmons	Massachusetts.

UNIVERSITY OF SOUTHERN CALIFORNIA, COLLEGE OF DENTISTRY.

THE annual commencement exercises of the College of Dentistry, University of Southern California, were held in Blanchard Music Hall, Los Angeles, Cal., on Wednesday afternoon, June 13, 1900.

The faculty address was delivered by Professor Francis M. Parker, D.D.S., secretary of the College of Dentistry, and the address for the class by Professor Henry G. Brainerd, A.B., M.D., dean of the College of Medicine.

The degree of D.D.S. was conferred on the following graduates by Professor Edgar Palmer, D.D.S., dean of the college:

Harry C. Gleason	California.
J. F. Galloway	California.
Eston P. Hilliker	California.
Edwin C. Kroeck	California.
C. D. V. Lawford	California.
W. L. Lowder	California.
W. B. P. Nehbel	Colorado.
Ulric D. Reed	California.
Richard A. Schroeder	California.
Joseph R. Sabichi	California.
James A. Cronkhite	California.

LOUISVILLE COLLEGE OF DENTISTRY.

The fourteenth annual commencement exercises of the Louisville College of Dentistry, Dental Department of the Central University of Kentucky, were held at Macauley's Theater, Wednesday, June 27, 1900, at 8 P.M.

The number of matriculates for the session was one hundred and thirty-nine.

The degree of D.D.S. was conferred on the following graduates by L. H. Blanton, D.D., chancellor:

Lone Butler	Illinois.
Charles W. Burt	Kentucky.
R. F. W. Briggs	Wisconsin.
Geo. L. Brown	Kentucky.
Harry M. Blanton	Kentucky.
Jno. S. Bennett	Kentucky.
Wm. R. Blue	Kentucky.
Carl B. Baker	Kentucky.
David L. Brooking	Missouri.
Edwin J. Chamberlin	Michigan.
Ernest M. Doyle	Kentucky.
Wm. M. Flexner	Kentucky.
Wm. I. Freeman	Kentucky.
Isaac Fierstein	Kentucky.
Eugene C. Fischer	Minnesota.
J. H. Groscurth	Indiana.
J. Robin Garr	Kentucky.
J. Robert Haskell	Kentucky.
Harry B. Holmes	Missouri.
James F. Harrison	Kentucky.
James B. Jordon	Kentucky.
Robert P. Keene	Kentucky.
Chas. F. Marshall	Kentucky.
James A. Malone	Kentucky.
Samuel D. McGaughy	Texas.
Edw. J. Martin	Indiana.
Jos. C. McGrail	Illinois.
Herbert Newman	Kentucky.
Allan F. Pelle	Kentucky.
Paul Prewitt	Kentucky.
Joshua H. Rooke	Kansas.
Chas. W. Reid	Missouri.
Wm. M. Randall	Kentucky.
L. Lynn Smith	Kentucky.
Garnett H. Smith	Kentucky.
J. Albert Smedley	Kentucky.
Thos. H. Sherman	North Dakota.
Chas. W. Seifkin	Iowa.
R. Homan Taylor	Kentucky.
Walter G. Tainter	Missouri.
Clarence E. Ward	Kentucky.
John H. Wood	Kentucky.
Henry G. Williams	Kentucky.
Frank L. Walters	Pennsylvania.
Andrew W. Yager	Kentucky.

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DENTAL SOCIETY ANNOUNCEMENTS.

MINNESOTA STATE DENTAL ASSOCIATION.

The seventeenth annual meeting of the Minnesota State Dental Association will be held in Minneapolis, Minn., September 5, 6, and 7, 1900. A cordial invitation is extended to all members of the professsion in this and other states. One-half fare on all roads to the "Twin Cities" that week.

A good meeting is assured. Come. H. L. Cruttenden, *Sec.*,
Northfield, Minn.

EDITORIAL.

THE EDUCATIONAL SYMPOSIUM.

We present in this issue a somewhat extended abstract of a portion of the proceedings of the recent meeting of the dental and oral section of the American Medical Association held at Atlantic City, N. J. The meeting was a remarkable one in the character of the work done, the papers presented, and the ideas promulgated. Two subjects were discussed from several points of view, each subject forming the topic for a symposium of essays. The first symposium dealt with education, the second with interstitial gingivitis. Our limits of space prevent the publication in this issue of more of the proceedings than a partial report of the first symposium.

A careful study of the papers reveals the fact that whatever differences of opinion the several writers may have held as to method, they were unanimous as to the desirability and necessity for a broad medical education as the foundation for the intelligent practice of dentistry. Divested of the factors of personal bias, of self-approbation, and of professional vanity which occasionally were manifested during the presentation and discussion of the topic, there still remains the fact that an intelligent body of men whose opinions are entitled to respectful consideration have definitely expressed the opinion that the present system of dental education is inadequate to properly equip the student for the practice of his profession. The indictment is a serious one, and if true should serve as the initial step toward a radical reform in our educational methods and ideals. We have contended elsewhere that the guiding motive in all educational systems is the utilitarian factor. If education does not confer increased efficiency, the power to do, it is not worthy the name. Incidentally it forms character, improves the social relationships and attributes of the individual, and increases his means of securing happiness; but it is the power which education confers upon the individual to work out a useful purpose to society and to himself which is its chief endowment, and to this end our systems of education are shaped. They are defective or fail in so far as they fail to achieve that purpose. It would seem, then, that the indictment embodied in the symposium when reduced to its final analysis means that the modern dental educational system is not sufficient to make dentists. There are those who will contend that this view is an error, that dentists, and fairly good ones, have been and, in fact, are being made by just the system under criticism. Perhaps even those who have most severely criticised the system will admit that it has not been altogether a failure when judged by the standard of its product.

But another element manifested itself in the symposium,—viz, that the title dentist by no means conveyed a homogeneous meaning to the minds of those who discussed the problem of his education. If each contributor had been asked to define his concept of a dentist, there would doubtless have resulted as many definitions as there were individuals. This difference of opinion is merely a reflex of that confusion of ideas as to what really constitutes dentistry which exists throughout the whole body of its practitioners, those who are preparing themselves for practice, and among the lay public.

We are in a formative stage of thought in regard to the matter, and though any period in the world's progress may be regarded as transitional in character, the present seems to be particularly so in dentistry. The rapidity of our development makes it possible for us to readily compare one with another the progressive steps in our advancement, for the reason that they so closely approximate each other in point of time. What constituted dentistry or the definition of dentist ten years ago would not meet the conditions existing at present. Study and research have developed the general interdependence of all the bodily tissues and their functions. The teeth are no longer external appendages with a passive relation to the organism. They have been definitely placed within the sphere of influence of the forces of bodily environment and relationship, hence their study, care, and treatment form a part of that department of human inquiry and activity which we call medical science and art. The recognition of this general principle has, we fear, led to certain unfortunate and ill-considered conclusions,—viz, that as dentistry is *de facto* a department of medical science and art, therefore the dentist must be a physician in the generally accepted meaning of that term; this conclusion we believe to be faulty, and if carried into practical effect under existing methods of medical education it would produce dentists less competent as practitioners than by the present methods of dental education. To be more specific, we believe it would be a useless expenditure of time and energy to require that the dental practitioner should first secure the medical degree under the conditions of the present medical curriculum and add thereto the dental degree by existing dental educational methods. This plan has been extensively tried in the aggregate, and experience has shown it to be defective in the particulars above alluded to; moreover, the resulting dentist is, as a rule, less capable as a practitioner than one who has obtained his training in a well-ordered dental school.

We are heartily in accord with the demand for a broad medical education for the dentist, and concede every point favorable to that result which the contributors to the symposium have advanced. We are of the opinion, however, that the result can be best obtained by a reorganization not only of dental teaching, but of the medical curriculum, not only with reference to dentistry but equally with reference to all of the other recognized specialties of medicine, so that the groundwork of all shall be uniform whatever the special educational superstructure may be. Much confusion has arisen in the discussion of this subject from the misuse and misunderstanding of the terms used. The old controversy aroused by the question, "Is dentistry a specialty of medicine?" was beclouded and rendered complex by the ambiguity of the terms of the proposition as stated and from a lack of clear definition of the meaning of dentistry and medicine. The constantly changing concept of dentistry and of medicine is simply an indication of the developing quality of the departments of human inquiry which they represent, hence any definition is likely to be of only temporary fitness. The definitions of dentistry in the older works and vocabularies are to-day ridiculously inadequate; they in many instances fail to define because of their impotent effort to particularize the list of factors which go to make up the field of dental activities. Others are fundamentally inadequate because they regard the dentist simply as a technician, and ignore the scientific medical basis of his calling.

Until greater unanimity has been reached with reference to what should be included in dentistry as a medical specialty, the reorganization of dental education will be hampered by disagreement as to the end to be attained.

As suggestive of the sphere of study and action which may be properly included in dentistry we offer the following: Dentistry,—A special department of medical science, embracing the structure, function, and therapeutics of the mouth and its contained organs, together with their surgical and prosthetic treatment.

It is not here intended to discuss details, but rather general principles. If it be once conceded that dentistry is a special department of medical science, as set forth above, then the conclusion is inevitable that in its educational development it must be treated as such in order to produce practitioners in agreement with that view. It is in that direction that dental education is surely tending, and it would seem to be the part of wisdom to fairly meet the situation by adapting our educational means to that end.

We commend the views set forth in the symposium to the thoughtful consideration of our readers as representing a status of opinion which must be dealt with in the spirit of fair, unbiased, logical treatment which its importance demands.

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OBITUARY.

DR. HENRY H. BURCHARD.

DIED, at Redlands, Cal., June 25, 1900, HENRY H. BURCHARD, M.D., D.D.S., in the thirty-eighth year of his age.

Dr. Burchard was born September 20, 1862, in Philadelphia, of an old American family. His early education was obtained in the public schools of his native city. In 1879 he left the Philadelphia High School and entered the engineering class of the United States Navy, as it was the desire of his father to equip him as a naval engineer. He, however, developed an interest in dentistry, and in 1881 entered the prosthetic laboratory of Dr. Frank R. Faber, then established in Philadelphia, where he acquired a knowledge and much practical experience in the construction of dental prosthetic appliances. In 1884, in partnership with Dr. Robt. Nones, he opened a prosthetic laboratory, continuing his studies at the Philadelphia Dental College in the mean time, from which institution he graduated in 1885. In 1886 he was made demonstrator of anatomy in the college from which he graduated, retaining that connection until 1888. He had matriculated at Jefferson Medical College in 1886, and graduated from that institution as Doctor of Medicine in 1888. He practiced medicine for about three years, returning to the practice of dentistry, the object of his first choice.

Dr. Burchard early in his professional career gave evidence of a high degree of literary ability, his articles covering a wide range of subjects. Outside of his professional affiliations numerous contributions on scientific, philosophical, literary, and artistic subjects were published from his pen.

About the time of his graduation in medicine he was made editor of the Science Department of "Catching's Compendium," a department which developed much importance under his able care. In 1888 he was elected to the microscopic and biological section of the Academy of Natural Sciences.

About 1893 he contributed a series of articles for *Items of Interest* on "Diseases of the Mouth," a work begun by the late Dr. Rehfuss and suddenly terminated by the untimely death of the latter. Numerous and important contributions from the pen of Dr. Burchard appear in the DENTAL COSMOS, notably articles upon "Abscess and Ulceration of the Pulp," "The Function of the Palatal Rugæ," "The Function of the Third Molar," "The Origin of Salivary Calculus," "Amalgams as Chemical Compounds," "Molding Tooth Forms," etc.

In 1896 he was elected to the chair of Pathology and Therapeutics in the Philadelphia Dental College, a position which he brilliantly filled until failing health compelled him to abandon the work of teaching at the end of the session of 1898. During his incumbency as teacher in the Philadelphia Dental College he wrote eight chapters for and assisted in the editing of the American Text-Book of Prosthetic Dentistry, and three and one-half chapters for the American Text-Book of Operative Dentistry, for which latter work he made over one hundred drawings and assisted largely in its preparation for the press. He also published a Compend of Dental Pathology and Therapeutics; wrote a section on Plastics for an unpublished volume of the American System of Dentistry, and revised the dental portion in the thirteenth edition of Gray's Anatomy. During this period he also revised the dental definitions for Duane's Dictionary and the dental definitions for Gould's Dictionary, and contributed the article on "Dentifrices" to Appleton's Hand-Book of Therapeutics. In 1898 he wrote his book on Dental Pathology, Therapeutics, and Pharmacology, which is the most elaborate of his writings. He had in preparation just previous to his death an extensive work on Comparative Dental Anatomy, and his untimely death will probably deprive the profession of the benefits which its publication would certainly have conferred.

Dr. Burchard was a voluminous writer, lucid and attractive in style, eminently scientific in his mental attitude, logical as a reasoner, and inherently a teacher. His enthusiasm for his work recognized no limitations. His energy was unbounded. When once the stimulus of a new idea took hold of him he knew no rest until his thought had found its material expression. His physical strength was wholly disproportionate to his nervous energy. The warnings of his friends and the advice of his physicians were all without effect in averting the inevitable result of his tendency to self-destruction from overwork. The guide and motive of his life was the love of truth. All of his activities were directed toward the increase of knowledge along the lines in which he worked, both positively by study and research, and negatively by the elimination of error. Kind, affectionate, and loyal in all the relations of life, always the ready champion of truth in its struggle against error, a brilliant mind in a body physically incapable of sustaining the unceasing pressure which he brought to bear upon it, a tremendous helping force in his profession,—such was Burchard.

If we may measure a life by its fruits rather than by its tale of years, then the life of Burchard has exceeded the vast majority of those who survive him. In the face of the event it seems hopeless to reason that it might have been otherwise, and yet we know of no more striking example of the extravagant dissipation of a useful career sacrificed by overwork for the good of his fellow-craftsmen than that furnished by the subject of this sketch.

Dr. Burchard was married, on April 30, 1888, to Miss Esther Vinson, who, with two daughters, survives him. He was buried at Hillside Cemetery, Redlands, Cal., June 27, 1900.

DR. PLINY I. LAWRENCE.

DIED, March 2, 1900, at Oak Park, Chicago, Ill., Dr. PLINY I. LAWRENCE, in his forty-fifth year, from meningitis following pneumonia.

Dr. Lawrence was born at Ellington, Conn., July 21, 1856. His initiation in dentistry took place in 1871, in which year he became a pupil in the office of Dr. I. A. Freeman. Independent professional work he began in 1877, in Chicago, where he continued to practice dentistry until his death. He was a member of the Illinois State Dental Society, and was interested in various fraternal organizations.

Dr. Lawrence married, April 2, 1877, at Kenosha, Wis., Miss Minnie L. Cooke, who, with three daughters, survives him.

DR. JOEL M. BEACH.

DIED, May 8, 1900, at Princeton, Ill., from general senile decay, Dr. JOEL MILES BEACH, in his eighty-seventh year.

Dr. Beach was born at Burlington, Conn., December 16, 1813. He studied dentistry under Dr. Crane, of Cincinnati. He began practice in 1839, opening an office in Pittsburg, Pa. In 1851 he went West, settling at Mt. Palatine, Putnam county, Ill. Here he remained until 1864, when he moved to Princeton, which has ever since been his home. He was in active professional practice for over half a century.

Dr. Beach married, in 1844, Miss Josephine Williams, of Philadelphia. She died four years later, and their only child, a son, died in infancy. In 1857 he married Mrs. Anne Wiley Smith, of Pittsburg. Of this union was born a daughter, who became the wife and is now the widow of Dr. William Landreth. Dr. Beach's second wife died in 1879, and he remained a widower until 1885, when he married Mrs. Woodruff, of Princeton, who died about five years ago.

A kindly man and a worthy citizen, Dr. Beach was held in high esteem both for his intelligence and for the integrity that marked his career. His professional work yielded gratifying pecuniary results, and his sterling qualities well entitled him to the favorable situation which he occupied in the community.

HINTS, QUERIES, AND COMMENTS.

METHOD OF BANDING LOGAN CROWN.—I see in the DENTAL COSMOS for May an improved method in the construction of a banded Logan crown by Dr. W. O. Talbot, Biloxi, Miss. His method is no doubt a very good one, but I do not like it so well as the one I have used for several years which I will describe. Grind the root up well under the gum-margins and fit the crown closely to it. Remove the enamel and fit a cap as for a Richmond crown. Punch a hole in the center of the cap, drive it on to the root, and the crown firmly against it. If you cut off the band in the right place you will have just as good a fit now between the crown and cap as you had between the crown and root. However, if any fitting is necessary grind the crown to fit the cap, fill the space in the crown with soft unannealed foil, packing it loosely until it stands quite out of the space. Drive the crown firmly against the cap. This condenses the gold and gives a tight joint between the cap and crown. Remove the cap and crown carefully, place 18 k. solder around the post, and solder all together. The solder flows out into the foil, making a strong union. Wrap the crown with one thickness of asbestos paper and the post with several; this prevents the post heating in advance of the porcelain. It may be held in the flame and soldered as an all-gold crown without investing. I much prefer this to a union depending upon cement in any form. There is a crown, however, that is not upon the market that admits of so much better an adaptation that it may not be amiss to describe it. This crown, Fig. 1, is baked on a platinum tube; the post screws into it and is "keyed to place" (*a*, Fig. 1). The post may be of German silver or any cheap metal which is much stiffer than platinum. To construct a crown the root would be cut off, a cap made as described for the Logan, and the post keyed to place.

After fitting the cap to the root and the crown to the cap, Fig. 2, place between the crown and cap a thin layer of Watts sliced gold, and drive the crown firmly to place. Now remove the cap and crown carefully and screw the nut down the post and firmly against the cap, Fig. 3. This gives you a perfectly tight joint between the cap and crown, and firmly unites the two; does away with the necessity of heating the crown, does away with that space, gives a wider range of adaptation, and gives many advantages space will not permit to mention.—W. H. Dwight, D.D.S., Le Mars, Iowa.

Fig. 1.

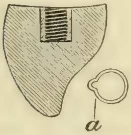


Fig. 2.

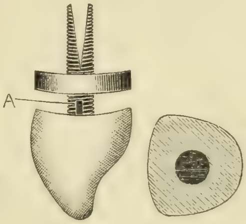
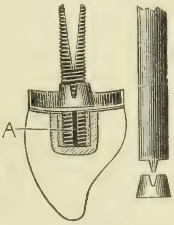


Fig. 3.



Iodoform Fumes in Treatment of Abscess.—A case recently came under my care, which is perhaps more interesting to the medical than the dental profession, but as it came to my knowledge through the lines of dentistry I think that it will interest the profession at large.

I have for some time been treating abscessed and devitalized teeth with the fumes of iodoform by the Dr. Blair method which was described in the Dental Cosmos for September, 1899.

About two months ago a patient came to me for treatment of an abscessed lower left first bicuspid. I began the treatment as usual with iodoform vapor, and during treatment I noticed that he was entirely deaf in the left ear. Upon questioning him he gave the following history:

About five years ago he had an attack of otitis media, with a large perforation of the tympanic membrane, which resulted in a very marked effect upon his hearing, but no suppuration. He had several specialists treat him, but with no appreciable benefit. Upon inflating the Eustachian tube he could hear fairly well for a short time.

It ran on in this way without any treatment for the last three years, and did not seem to get any worse up to eight months ago, when a slow suppuration began, with hearing entirely lost on left side. Having had such remarkable success treating abscessed teeth with iodoform fumes, it at once suggested itself to me, why could not the same treatment be successfully applied to the case in hand? So obtaining the consent of my patient I began the following treatment:

I first washed out the external ear with hot water, and then put in an application of sweet oil, dismissed the patient until the next day, when I first syringed out the ear with H_2O_2. This seemed to loosen up considerable *débris,* which I washed out with hot water, after which I dried out the canal thoroughly with absorbent cotton on a probe. Then I applied the iodoform vapor, using a rubber speculum in the ear to allow the point of instrument to reach far into the ear without burning, by contact with mucous membrane. I also inflated the Eustachian canal at each sitting.

This treatment I continued every day until suppuration ceased, when I gradually stopped treatment with not only suppuration stopped, but also hearing better than at any time since the trouble first began. I am of the opinion that the iodin liberated helped to allay the inflammation and caused atrophy of the thickened membrane, thereby materially helping hearing.

The time is as yet too short to decide what the final outcome will be, but as yet there is no sign of returning suppuration, and I see no reason why the cure will not be as permanent as in case of an abscessed tooth, which we all know is about as hard a thing to treat satisfactorily as we have.—F. C. LEWIS, D.D.S., Centralia, Wash.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Will any of your readers give an opinion on the following case:

Boy, aged three years, was brought to me by his mother with the request from the family physician that I would extract all of his teeth. On examination I found the following conditions: The crowns of all the teeth (except six lower anterior) were entirely destroyed down to the margin of the gums; the roots were firm and presented a smooth, brown, polished surface. The surface of the tongue and gums had numerous red glistening patches with white spots interspersed and slightly elevated. I diagnosed the case as "Thrush," but was at a loss to account for the complete destruction of the crowns. Father and mother's teeth good, and four other children all had good teeth. I could not learn what medicine the child had been given. As there was no pain referred to the roots I refused to extract any of them, and referred the case back to the physician for systemic treatment. What was the cause of the destruction of teeth, and was I right not to extract?

I. AUBREY PITCHER.

GEORGETOWN, DEMERARA, June 9, 1900.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

APPLICABLE OR PERTAINING TO DENTISTRY

ISSUED DURING JUNE, 1900.

June *12.*—No. 651,388, to FINIS E. ROACH. Artificial tooth.
" " —No. 651,469, to OSCAR H. and ALPHONSE F. PIEPER. Dental motor.
" " —No. 651,753, to BENJ. C. FOWLKES. Dental compound.
" *19.*—No. 651,922, to WM. E. HARPER. Dental instrument.
" " —No. 652,047, to NELSON T. SHIELDS and GEO. F. JERNIGAN. Artificial tooth.
" " —No. 652,197, to WILLIE F. SLACK. Dental heater.
" *26.*—No. 652,404, to LEE C. SHARP. Dental appliance.
" " —No. 652,719, to JACOB F. MAYER. Fan attachment for spittoons.

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ORIGINAL COMMUNICATIONS.

REPORT OF THE FOREIGN RELATIONS COMMITTEE OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES.

(Reported and adopted at Old Point Comfort, Va., July 14, 1900.)

DURING the past year the work of the Foreign Relations Committee has been materially extended. Advisory boards in most foreign countries have been provided for, and appointments made to fill them as fast as sufficiently definite information to enable the committee to do this properly could be obtained. Pamphlets containing an exposition of the work and the aims of the National Association of Dental Faculties have been printed and circulated in foreign countries, and a number of circulars of information for members of our foreign advisory boards have been printed and mailed to them. In addition, as directed by the association at its last meeting, a pamphlet containing digests of the reports made at that meeting has been printed and mailed to each member of the association, and to other interested members of the profession in America and abroad.

All this has involved considerable expense for printing and postage, but we believe that it has been a wise expenditure of money, as by its means the dental profession of the world has been made aware of the existence of an association of the regular and recognized dental schools of America which is devoted to the advancement of the cause of dental education and to the elevation of the status of dentistry among all nations.

It is unfortunately the fact that, because of the lack of uniformity in the educational systems of the different states, and the absence of any general supervisory authority on the part of the national government, under some unwise local legislation it has been possible for irresponsible, unqualified, and unscrupulous men to secure charters for institutions empowered to grant degrees, and under such authority to issue, for a consideration, irregular and fraudulent diplomas. This traffic has principally been with men in foreign countries, who, primarily the guilty ones, have sought to obtain academic honors without the labor necessary honestly to acquire them. As these institutions have been conducted under pretentious names, it was formerly impossible for foreigners who had no intimate acquaintance with American educational affairs to distinguish between the regular and the irregular schools. The organization of this association has established a criterion by which they may be judged, only those owning allegiance to the National Association of Dental Faculties being recognized.

It is unfortunate that the professional situation in America has not in past years been better comprehended in Europe. All our schools have been held responsible for the vile work of the fraudulent ones,—nominally located in this country, but chiefly supported by unprofessional men from abroad. There has even been a grave misapprehension of the objects of this association, and the work of the Foreign Relations Committee has in some instances been totally misconstrued. All of us are aware that while some of the very best and ablest American representatives have located in foreign countries, and to whose professional career we can point with pride, it is unfortunately the case that some Americans of a different professional reputation have gone abroad and have indulged in practices as offensive to our foreign *confrères* as they are to reputable American practitioners. There are many more unworthy foreigners who have legitimately or illegitimately become possessed of an American degree, and who, without warrant of right, claim the title of "American dentist."

The belief is prevalent in certain foreign professional circles that it is the aim of the National Association and its Foreign Relations Committee to obtain for all such persons professional recognition, and to demand the acceptance of their American degree by the governments of foreign countries. It is but proper that we should in the most authoritative manner deny any aspirations of the kind. This association has not in the remotest manner contemplated any interference with or protest against the laws or regulations governing the practice of dentistry in any foreign country. It has not primarily been the object of either the National Association or its Foreign Relations Committee to attempt to secure for the American dental degree any legal recognition as a qualification for foreign practice. It is not usual in the American states which have legal professional regulations to receive the diplomas of any foreign professional school as a qualification for practice, and we cannot consistently ask that which we refuse to others.

It seems but proper that we should publicly avow the reasons that have prompted the better colleges to form this association of schools, and to appoint a committee charged with the duty of harmonizing our relations with the dental profession in other lands.

We seek for the distinctive American dental diploma nothing more than the consideration which its merits demand. If its reputation has been debased by the circulation of counterfeit diplomas, it is something for which we are in no way responsible. In the formative educational period, when dental schools existed nowhere save in America, and when even dentistry itself was undefined, empirical, tentative, with no distinctive line of practice and no clearly prescribed curriculum of study, the newly adopted degree may have been conferred in some instances on insufficient acquirements. The experiment of establishing a special dental educational course of study, and thus laying the foundation for the broad profession which exists in all civilized countries to-day, was first tried in America, and here tested for the whole world. There were no precedents for our guidance, and no earlier successes or failures to stand as landmarks. We were the absolute pioneers, and it would be little wonder if we made some errors.

Since that day other countries have drawn professional lines, and marked out, each for itself, a distinctive course of procedure. Each of these varies somewhat from the others, and perhaps all from that originally established in America. If dentistry is to be accepted as a profession at all, or as a distinct branch of a great mother profession, it must be broader than is any state; it cannot be confined by any bourne, nor limited by mountains, rivers, or oceans. There should be no American, English, German, or French dental profession, except as each is a part of one undivided whole. Realizing all this, the National Association of Dental Faculties was organized for, and has been constantly laboring to attain, these definite purposes:

First. To establish a broad and generally accepted curriculum of dental study, and by the combination of all the better dental schools of America to bring each up to a uniform standard of excellence.

Second. To establish a clear line of demarkation between the regular and the irregular schools, and to force out of existence the latter.

Third. Gradually to raise the standard of preliminary education until none but such as have the general erudition that should distinguish a professional man can be accepted in American dental colleges.

These were the principal objects in view, and in the attainment of them success has been secured exceeding the most sanguine expectations of the founders of the movement.

In the development of its plans the association met with many obstacles, and found itself laboring under great embarrassments. One of the chief of these was the lack of information concerning professional affairs in foreign countries. The association decided, so far as was in its power, to co-operate with the worthy dentists of other countries in the laying down of certain broad principles which must be the foundation upon which any true professional practice could rest. Any international co-operation must be based upon a complete knowledge by each of the methods and aims of the others. There can be no concurrent effort without mutual comprehension and intelligence.

Another perplexity was found in the fact that in establishing the preliminary qualifications for matriculation in American colleges there was no rule by which to judge of the value of certificates presented by foreign students. After completing the course of some foreign school, a student, who perhaps spoke only a strange language, sometimes desired to conclude his studies by taking as much of the American course as would enable him to finish it, and he demanded of some American college advanced standing of one or more years. His certificates were in a foreign tongue, and in some instances were found either forged or not that which they were represented to be.

In this emergency, at the earnest request of certain American dentists practicing in foreign countries, who had been scandalized by the acceptance in America of students with improper certificates, a committee, to be called the "Committee on Foreign Relations," was appointed, and was charged with certain definite duties:

First. It was to be in all things subordinate and subservient to the National Association of Dental Faculties, to which body it must make a full report each year.

Second. It was empowered to appoint advisory boards of not more than three members in each foreign country having any professional relations with America, whose reports concerning foreign qualifications might form a basis for action in this country.

Third. It was to have jurisdiction in all foreign educational questions affecting American dental colleges.

Fourth. It was to obtain definite information concerning dental regulations and laws in foreign countries; to learn what were the curriculum and requirements of all foreign dental schools, with the view of determining what value should, under American laws and regulations, be given their certificates of study, either as a qualification for dental practice in America or for admission to advanced standing in American dental colleges.

Fifth. It was charged with the duty of ferreting out institutions engaged in the granting of irregular degrees or degrees irregularly, and instituting measures for their suppression.

In compliance with the first enumerated duty your committee makes this report of what it has done during the past year, and appends the recommendations for future action which its experience leads it to believe advisable. It has earnestly striven to carry out what its members believed to be the wishes of this association, and it has had no policy of its own to inaugurate or attempt to enforce. It has in all things been governed by what it believed to be the spirit of its instructions.

Concerning the second business with which it was charged, your committee begs to report that it has divided the various countries of both the Eastern and Western Hemispheres into convenient groups, and has appointed boards for each, so far as the information obtainable has warranted. In making such appointments it has deemed the following qualifications essential:

First. The appointee should be a regular and reputable dentist, possessing the legal qualifications of the country which he represents.

Second. He must be a graduate of some reputable American dental school, or possess an acquaintance with the curricula of American schools, and be familiar with American dental professional methods. The list of such appointments is appended for the approval of this association.

In the discharge of the third duty imposed upon us your committee has met with great embarrassments. At the very outset colleges, members of this association, appealed to us to know what consideration should be given to certificates showing that proposed students had taken the full course in schools located in Japan and Mexico, which purported to teach the whole dental curriculum. Your committee could not learn that any schools giving a course in dentistry that could be accepted as an equivalent for any part of that demanded by this association existed in either country. They therefore ruled that students from either could only be accepted as members of the freshman class of American dental colleges, and only then if they complied with the rules of the association so far as preliminary education and a knowledge of the English language are concerned. This ruling was cheerfully accepted by the schools that had raised the question, and we present it as an encouraging proof of the loyalty and anxious desire for a high standard that exists among the recognized dental colleges of America.

But the discussion of this raised the question of the consideration that should be given to the certificates of study from any foreign dental school. Our rules provide that no credit shall be given to certificates from any American dental school whose curriculum and regulations have not received the formal approval of this association. Could we, in the name of the National Association of Dental Faculties, approve the giving of advanced standing to students from the schools of other countries that had not the same stamp of regularity? That is, could we extend to foreign and unknown dental teaching institutions privileges that were positively forbidden to American schools? And yet the responsibility of deciding this question had been thrust upon us by this association, and we could not evade the obligation. It took but a short time to arrive at the inevitable conclusion that we could not approve the giving of advanced standing to graduates or undergraduates of any foreign dental school whatever until such school had received the formal indorsement of this body.

Fortunately, few of these questions arose in time to affect any student for the term of 1899-1900. We informed the colleges presenting the cases that the matter would be referred to this annual meeting, and the committee is prepared to offer certain recommendations for the recognition of foreign schools, based upon such knowledge as we have been able to obtain. The whole matter is referred to this body for final adjustment.

In the discharge of the fourth duty that devolved upon us, your committee is in possession of a very voluminous mass of correspondence and reports, which it has earnestly labored to reduce to some system. The advisory boards appointed have, in a considerable number of instances, forwarded as full information concerning dental schools and the regulations governing dental practice in the countries represented by them as could be obtained, and it is upon such reports that the recommendations of your committee are wholly based. How much of them shall be given to the profession of America by publication must be decided by the association. It would be quite impossible to print the great mass of correspondence unless a large volume should be devoted to that purpose.

Under the fifth head, your committee begs leave to report that a great deal has been accomplished. The same legal counsel employed last year has been retained, and the same general course has been pursued. It is probable that more fraudulent diplomas have been sold in foreign countries during the past year than ever before. This is due to the fact that those who have been carrying on the traffic realize that, because of activity in their prosecution, the time for accountability is near at hand, and they are striving to make the most of the present opportunity.

It is urged by foreigners that this business should be summarily stopped. Such people little know the difficulties in the way. In the first place, the traffic is mostly with foreigners. As their illegitimate diplomas are wholly worthless in this country, no State Board of Examiners recognizing them in any way, those who are engaged in the business carefully cover their tracks, and no responsible man can be located. Attempts to entrap them by means of decoy letters have failed, some such having crossed the ocean a number of times without delivery, being forwarded from one of their foreign agents through whom the nefarious business is carried on to another, until finally returned to the writer by the post-office authorities. Fictitious names are signed to the pretended diplomas, so that it has been found almost impossible to fix the guilt upon any person. Our friends in foreign countries have contented themselves with bitter reproaches against American colleges generally, without forwarding any testimony that would assist in the discovery of the guilty ones. The fraudulent institutions could not by foreigners be distinguished from the regular colleges, for they were in possession of charters regularly granted under a vicious law of the state of Illinois, whose entire repeal it had been found impossible to secure, because the interests of legitimate enterprises were inextricably bound up with the illegitimate ones.

Your committee early discovered that working alone it could accomplish little. The Board of Health of the state of Illinois was taking the matter up, and they possessed advantages for the prosecution of the lawbreakers which were not within our reach. We have therefore contented ourselves with co-operating with that board in every way possible, and our counsel has been instructed to offer them any assistance within our power. As a consequence we have great pleasure in reporting that, acting under the United States law, which forbids the use of the mails for fraudulent purposes, the worst of these offenders have finally been apprehended and committed to jail in default of the heavy bail that was demanded. What is of more importance, if possible, the United States mails are closed against the transmission of their correspondence, and letters to or from them are promptly sequestrated.

The greatest offender was last year named in this report as "The Independent Medical College of Chicago." We secured the annulment of the charter of this affair, but in a very short time we found that the same men were yet engaged in the business under the name of "The Cosmopolitan Medical College." They had offered for sale no less than thirty-six different diplomas in all the branches of science and art, and since the forfeiture of the charter under which they first worked it is believed they have sold more than a thousand fraudulent diplomas, at prices varying from ten to five hundred dollars each. Proof sufficient to secure the cancellation of the first charter was only obtained through the inordinate cupidity of the man who was chiefly responsible. He paid a debt of some thirty dollars due to a stable-man, or hostler, by issuing a diploma to him and making him a professional man. The recipient, when he found himself under arrest for attempting practice under it, betrayed the swindler, and we were thus able to fix his guilt.

The late proceedings against this man and his associates have developed the fact that they were in possession of no less than *twenty-four* different charters, all regularly issued under that mischievous Illinois law, which was enacted for beneficent purposes. We have now learned the methods of these men, and it is believed that it will soon be possible to put an entire stop to their villainous traffic, through the imprisonment under the United States postal laws of those engaged in it. Too much credit cannot be given the Board of Health of the state of Illinois for the active part it has taken in the suppression of these miserable pretenders that have so long been bringing discredit upon our legitimate and excellent educational institutions.

In view of the fact that the other work of the Foreign Relations Committee is more than sufficient to engage all its surplus energies, and in further consideration that the work of the suppression of the fraudulent schools is now well in hand and the path for action fully defined, your committee recommends that this work be, for the future, placed in the hands of the Committee on Law, which shall receive the same instructions as those heretofore given the Committee on Foreign Relations.

The progress that this association is making in its efforts to raise the status of professional teaching in our own country, to obtain a better appreciation of American professional affairs in foreign countries, and to maintain steady advancement toward a dental solidarity among all nations, is very encouraging to every lover of humanity. It is true that even at home there may in uninformed circles yet be found some remnants of an unworthy professional jealousy, a failure to comprehend the real educational situation, and a tendency to attribute to our teachers motives unworthy any honest man. But the steady, persistent work of this association in elevating the accepted standard just as fast as prudence permits, has wrought a great change in professional sentiment and immeasurably benefited the schools, and through them the profession at large. It only remains for us to continue this good work a few years longer to produce results that will be permanent in their character, and so firmly established as henceforth to be self-sustaining.

Report concerning Foreign Equivalents.

Your committee has very carefully considered a great mass of correspondence and many voluminous reports, and begs hereby to submit the conclusions which it has reached. It must not be forgotten that the system of dental instruction in Europe varies very widely from that of our special American dental schools. Instruction separate from that given in the medical schools or universities is very rare, and the practical training which forms a part of our curriculum is usually given by private preceptors.

Your committee does not feel at liberty to recommend the acceptance of an oral and theoretical course as the equivalent for one including practical work. We cannot believe that the certificates of private and irresponsible practitioners can by us be accepted as any part of a college course, and hence we have given them little consideration. It is quite probable that in some instances we have recommended that one year's advanced standing be given the holders of some certificates when further knowledge might show that they should be admitted to our senior classes, but we have thought it wisdom to err, if any mistakes are made, upon the safer side, as future action can readily correct any such errors.

Australia.

A very complete report from the various colonies of Australia and New Zealand has been made by the advisory board appointed for those countries. It would appear that in most of the colonies there is no dental legislation, but Victoria has lately secured a law analogous to that of England, and in Melbourne a dental school has been organized whose curriculum, from the partial syllabus furnished, seems to be a comparatively broad one. The dean of the "Australia College of Dentistry" is an American graduate, and he appears to have the confidence of the dentists of Australia.

Your committee is unable positively to determine whether the school in all respects comes up to our minimum requirements, but this it has directed its chairman definitely to ascertain, after which your committee will be prepared to recommend to this body some proper action. There has also been established in Melbourne, Province of Victoria, the "Dental College and Oral Hospital of Victoria," but your committee is not at the present time in possession of sufficiently definite information to enable it to offer any recommendation concerning it.

In the provinces of Western Australia and Tasmania no dental legislation has been secured.

There is a dental law in New Zealand, and the member of the advisory board from that province has furnished your committee with an abstract of it. There are no dental schools in the province.

Switzerland.

Full reports from this country have been furnished by Dr. Bryan. It is a republic analogous to our own country in some respects, the federal union being composed of separate cantons. There are some excellent universities which offer certain facilities for dental study, but their practical instruction, we believe, cannot be accepted as an equivalent for that offered by American dental colleges. Your committee recommends that holders of the Swiss national diploma be given one year's advanced standing in the schools of this association, but that no consideration be at present extended to holders of the cantonal qualifications.

Spain.

Complete reports have been furnished by members of the advisory board. The Spanish requirements in medicine are very high, but your committee cannot learn that there are any dental schools, or dental departments of universities, whose course of instruction can be accepted as the full equivalent for the instruction given in American dental colleges.

France.

Your committee is aware that separate dental schools exist in France, and its chairman has been in daily expectation of receiving their curriculum of study, but up to this time has been disappointed. Without this exact knowledge the members do not feel themselves justified in recommending any action, for we cannot proceed in so grave a matter upon mere assertions or impressions. As members of your committee will visit France in the immediate future, and will carefully investigate the course of study, we ask that we be given authority to incorporate our recommendations in this report after such investigation shall have been completed.

Germany and Austria.

The dental schools of these countries are departments of the universities, and only university students attend them. The instruction consists of lectures and clinical work given by from one to three dental professors, who lecture upon the different dental subjects. Instruction in chemistry and allied studies is afforded in the School of Philosophy or Science; in anatomy, physiology, etc., in the School of Medicine. No special instruction is given dental students except by the very few dental teachers. The clinical instruction is largely devoted to extraction and oral surgery. The practical work is usually quite limited. There is no obligatory course, but students enter for such lectures as they may choose, paying the fees of each professor separately. There are no obligatory hours for study or lectures.

The mechanical instruction consists of lectures on the principles of mechanics, the practical work being usually done in private laboratories. The examinations have very little resemblance to ours, each teacher asking three questions out of a list of forty approved by government. They are not usually as exhaustive or comprehensive or scrutinizing as ours. The licensing or approving power rests with the "Kultus Ministerium," or department of religion and education. The great majority of dentists in practice are Zahntechnichers,—mechanical dentists,—upon whose work no restrictions are placed, as they are not recognized by the government.

Your committee recommends that students speaking the English language, who have taken the full dental course in German or Austrian universities, be eligible for reception in the junior classes of American dental colleges, provided it be shown that they have had at least two semesters of competent college instruction in practical laboratory and operative work. It further recommends that students speaking the English language who have had at least four semesters of such instruction in operative and prosthetic practical courses, and who shall have finished the dental course in the University of Berlin, or in any German or Austrian dental school whose course of instruction offers a full equivalent, be eligible for admission to the senior classes of accepted American dental colleges.

Italy.

In Italy the practice of dentistry was long without special restrictions. Then an attendance upon lectures in a medical school was required, and a dental diploma was issued. In 1892 a law was passed which required dentists to obtain a medical diploma. This was not enforced until 1898, when a movement against foreign practitioners was inaugurated. They appealed to the courts and carried the matter to the supreme court, which decided that those in practice previous to 1888 had rights which could not be abrogated. At present the law of 1892 is in force, and this requires a medical diploma for the practice of dentistry and phlebotomy.

There are, we believe, no schools in Italy which have courses that can be accepted as equivalent to those of our American dental schools. The instruction given in the medical schools your committee believes to be too exclusively general in its character to form an acceptable course in dentistry for American students.

Mexico.

There is a medical school in the City of Mexico which purports to give dental instruction. Your committee cannot learn that it is of such a character as will enable it to be accepted as the equivalent for a course in an American college.

Japan.

There is one dental school in Japan,—that of Dr. Takayama, in Tokio. It confers no degree, but gives a certificate which entitles the holder to government examination, the same as if he had studied with some practicing dentist. As the instruction is personal and the school is quite irresponsible, your committee believes that no consideration can be given to it.

Holland and Belgium.

In these countries the title of dentist is obtained by passing a practical examination in the theory and practice of dentistry. There are no separate dental schools, and we are not sufficiently informed of the comprehensiveness of the syllabi of the universities to offer any recommendations concerning them.

Great Britain.

There can be no questioning the fact that England has some excellent dental schools. The only embarrassing circumstance in the determination of their status relative to ours lies in the great difference between the educational systems of the two countries. Undoubtedly they place greater stress upon preliminary educational requirements than do we, but your committee is of the opinion that our practical instruction is superior. Originally, we believe, there was little instruction given in prosthetic work during the term of attendance upon hospital lectures. Students were supposed to come to the college for didactic instruction, the practical part having been previously communicated by a preceptor. It should be comprehended that English dentists frequently employ a mechanic, who is not required to possess any special educational qualifications, the registered dentist mainly confining his attention to the operations of the surgery or operating room.

In this country we believe the practical work of the laboratory should form a part of the college course, and we do not graduate a student until he shall have satisfactorily completed the whole curriculum within the college walls. We are under the impression that the English system is undergoing a change in this respect, and that practical laboratory work will soon form a part of the obligatory college course. We recommend that all students who shall have finished the complete course in any recognized English, Irish, or Scotch dental school or hospital shall be eligible for reception as senior students in American dental colleges upon proof of their having taken as a part of such course two years of instruction in a properly equipped dental laboratory and dental infirmary connected or affiliated with such dental school or hospital, and which requires the successful completion of the work deemed essential by recognized American schools, as formulated in the minimum requirements for foreign dental schools accompanying this report. We further recommend that for the present no consideration be given to partial courses in any of the dental schools of Great Britain.

Sweden.

Very complete reports have been furnished by the chairman of the advisory board, Dr. Förberg.

The country has one dental school, which is the dental department of the "Carolina Medico-Chirurgical Institute of Stockholm." Instruction is given by five professors of the medical department, and there are three dental professors, occupying respectively the chairs of dental surgery, operative dentistry, and dental prosthetics and orthodontia. From the assurances given by Dr. Förberg, your committee believes that its graduates should be permitted to enter the second-year class of recognized American dental colleges, provided they shall have complied with our requirements concerning mechanical laboratory work.

Your committee has not sufficient knowledge concerning this school to warrant further recommendations at present.

Canada.

In the Dominion of Canada there is but one school which demands consideration, and that is a member of this body. Yet the educational systems of the two countries, especially in professional matters, are so different as to engender continual embarrassments. Canada being a foreign country, your committee has felt itself bound in duty to place it in the list of those countries whose relations with us must be taken into consideration. The dental educational system of Ontario approaches more nearly that of England than that of America. It has an analogous system of indentures which the dental student must sign, and private preceptorship forms a portion of its obligatory instruction.

This is directly at variance with our system, which accepts no tutorship by irresponsible parties. The dental law of Ontario forbids the entrance upon practice of any one who has not taken his final course of instruction in the Royal College of Dental Surgeons of Ontario. We believe that this principle is the correct one, and that the same rule should be made applicable in the United States, and that here, as there, no foreign qualification should be sufficient for registration in the various states of America. But the membership of this foreign school in our association presents an embarrassment which for the present seems insuperable, and your committee therefore has no recommendation to make, but leaves the matter for future consideration in the hope that some code of international agreement may be devised which will give to the graduates of America's recognized colleges who desire to practice in Canada the same privileges extended to the alumni of the excellent Ontario dental college.

Concerning other foreign countries, your committee is not in possession of sufficiently definite information to warrant any action whatever. We have no knowledge of the existence of any courses of instruction which can be accepted as an equivalent for courses in the institutions having membership in this body, and therefore advanced standing in our schools cannot in justice to our own students be granted, save in the instances above enumerated. The committee will gladly make use of any further information which may be furnished them, and will, in the furtherance of the duty with which they are charged by this association, embody such knowledge in future reports.

The following is a list of the countries for which advisory boards have been designated, and the appointments and nominations so far as made:

COUNTRY.	NAME.	COLLEGE.	POST OFFICE ADDRESS.
Great Britain.	Wm. Mitchell, D.D.S.	Univ. of Michigan.	39 Upper Brook st., London, Eng.
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" "	B. J. Bonnell.	....	94 Cornwall Gardens, So. Kensington, London.
Holland and Belgium.	J. E. Grevers, D.D.S.	....	13 Oude Turfmarkt, Amsterdam, Holland.
" "	Ed. Rosenthal, D.D.S.	Harvard Univ.	19 Boul. du Regent, Brussels, Belgium.
" "	C. Van der Hoeven, D.D.S.	....	Der Haag.
Denmark, Swe. & Nor'y.	Elof Förberg, D.D.S.	Phil. Dental College.	Sturegatan 24, Stockholm, Sweden.
" "	S. S. Andersen, D.D.S.	Univ. Pennsylvania.	Christiania, Norway.
" "	L. P. Vorslund-Kjaer, D.D.S.	Phil. Dental College.	Copenhagen, Denmark.
Russia.	H. V. Wollison, D.D.S.	N. Y. Coll. Dent.	10 Quai de l'Amaranti, St. Petersburg, Bussia.
"	Theo. Weber, D.D.S.	N. Y. Coll. Dent.	Helsingfors, Finland.
"	Geo. Th. Berger, D.D.S.	Phil. Dental Col. '77.	St. Petersburg, Russia.
Germany.	W. D. Miller, D.D.S.	Univ. Pennsylvania.	Victoriastrasse 30, Berlin, Germany.
"	C. F. W. Bödecker, D.D.S.	N. Y. Coll. Dent.	55 Unter den Linden, Berlin, Germany.
"	Friedrich Hesse, D.D.S.	N. Y. Coll. Dent.	Goethe Str. 6, Leipsig, Germany.
Austria and Hungary.	Dr. Szigmondi.	....	....
" "	Dr. Waeisser.	....	....
" "	Dr. Arkovy.	....	....
Italy and Greece.	Albert T. Webb, D.D.S.	Univ. Pennsylvania.	87 Via Nazionale, Rome, Italy.
" "	Tullio Avanzi.	....	....
" "	A. V. Elliott, D.D.S.	Univ. of Mich. '87.	10 Via Tornabuoni, Florence, Italy.
France.	J. H. Spaulding, D.D.S	Univ. Minnesota.	39 Boul. Malesherbes, Paris, France.
"	I. B. Davenport, M.D	Coll. P. & S., New York.	30 Ave. de l'Opera, Paris, France.
"	G. A. Roussell, D.D.S.	N. Y. Coll. Dent.	74 B'd Haussmann, Paris, France.
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" "	Florestan Aguilar, D.D.S.	Phil. Dental Coll.	Serrano 5, Madrid, Spain.
" "	T. J. Thomas, D.D.S.	....	Bilbao, Spain.
Switzerland and Turkey.	L. C. Bryan, D.D.S.	Boston Dent. Coll.	1 Steinenberg, Basel, Switzerland.
" "	Theo. Frick, D.D.S.	Univ. Pennsylvania.	14 Tonhallenstrasse, Zurich, Switzerland.
" "	Paul J. Guye, D.D.S.	Penn. Dent. Coll.	12 Rue de Candolle, Geneva, Switzerland.
Japan, China and India.	Louis Ottofy, D.D.S.	Western Dent. Coll.	87 Main street, Yokohama, Japan.
" " "	J. Ward Hall, D.D.S.	....	Shanghai, China.
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" " "	A. P. Merrill, D.D.S.	Phil. Dent. Coll.	52 Collins st., Melbourne.
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Mexico & Cent. America.	....	....	....
Venez., Colom. & Ecua'r.	....	....	....
Peru, Bolivia and Chili.	S. R. Salazar, D.D.S.	Chicago Col. Dent. Surg.	Lima, Peru.
Brazil and Guiana.	....	....	....
Argentine, Para. & Uru.	....	....	....

REPORT CONCERNING THE MINIMUM REQUIREMENTS TO BE DEMANDED BY THE NATIONAL ASSOCIATION OF DENTAL FACULTIES FOR THE RECOGNITION OF FOREIGN DENTAL SCHOOLS WHOSE STUDENTS DESIRE ADVANCED STANDING IN THE COLLEGES BELONGING TO THE ASSOCIATION.

That a proper standard may be adopted by which the relative value of the courses in foreign dental schools whose students offer them as equivalents for a part of the instruction given in the colleges of this association may be determined, your committee recommends the approval of the following as the minimum of requirements demanded:

1. The college must require of matriculants a preliminary education which is the full equivalent of that demanded by the schools of this association.
2. The college must demand of students full attendance upon at least three full annual courses (not semesters) of lectures of not less than seven calendar months each, in separate years, covering all the studies proper to a full dental curriculum.
3. The college must possess a bacteriological laboratory, with sufficient of equipment for instruction in a competent course in bacteriology, which must form a part of its curriculum of study.
4. The same must be required in chemistry, histology, and pathology.
5. There must be a technic laboratory in which shall be taught the proper manipulations for the insertion of all kinds of fillings for teeth, the preparation and filling of the roots of teeth, the tempering and shaping of instruments, the drawing of wire and tubing for cases in orthodontia, and the cutting of bolts and nuts.
6. There must be prosthetic laboratories sufficiently equipped for teaching all kinds of prosthetic work, and the construction of all the approved prosthetic appliances.
7. There must be a sufficiently equipped laboratory for instruction in making crowns and bridges, and the construction of appliances used in orthodontia.
8. There must be a properly equipped infirmary or surgery for the reception of patients, upon whom each and every student shall be required individually to perform all and enough of the operations necessary in dental practice thoroughly to qualify him for the successful pursuance of his profession.
9. Complete records of the work done by each student, of his attainments at sufficient and full examination in each subject of the curriculum of study, of his attendance and deportment during the course, must be permanently kept.
10. No credit must be allowed for any work not done under the immediate supervision of instructors connected with or especially approved by the college, and who are in direct affiliation with the faculty.

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Foreign Relations Committee.

PORCELAIN AS A BENEFICIAL ART IN DENTISTRY.

BY F. J. CAPON, D.D.S., M.D.S., TORONTO, CANADA.

(Read before the Dental Society of the State of New York, May 9, 1900.)

"THE true work of art," says Michael Angelo, "is but a shadow of the divine perfection."

"The art of an age or nation," writes another, "is the efflorescence of its whole spiritual life and endeavor." The art of a people is therefore only the embodiment of its prevailing ideas, affections, and conceptions in architecture, in sculpture, and on the glowing canvas.

Thus a dentist may be skilled in mechanism but still lack the innate art which is required to produce nature's conceptions. A porcelain worker requires at least a percentage of this innate art. Unless he is born with faculties that he can cultivate, and which will enable him to become proficient; unless he is born with talents that will develop a fine artistic and mechanical skill, he will never be an expert in porcelain work, though his manual training may be the best the office or college can give; he must have a base to build it on, and that he gets at his birth.

Porcelain was introduced into dentistry about the beginning of the present century. The attempts made were but poor as to form and color, representing the natural organs very imperfectly. Little improvement was made until Dr. Wildman, of Philadelphia, in 1838, produced such results in life-like appearance as had not been obtained before. Thus the progress which has been made in porcelain is credited to the profession of this country, the cradle of all modern dentistry. The introduction of porcelain into dentistry gives a widespread field of art and of manipulation, varying in application yet dovetailing into each other, making it necessary for a student to acquaint himself with the underlying principles of art as well as to have a knowledge of the manufacture of bodies and enamels, with the modes of vitrifying them, whether by gas, electricity, oil, or coke.

Much has been said of late as to the merits of high and low-grade bodies; possibly they would be more properly classified as high, medium, and low. The true high-grade is termed block body, which is used by the manufacturers to produce the gum blocks and all artificial teeth, which are the nearest production we have to the natural appearance. Thus as we vary in grade from the block bodies we lose the transparent life-like appearance.

The medium are the bodies put on the market as high-grade. They work fairly well in producing shade, contour, and strength.

The low body, as found on the market, should hardly be classified as a body, as it is composed of such a large proportion of glass as to render it useless for high-grade work in the furnace, and as a substitute is a failure, producing poor results which discourage the beginner, "porcelain" being set aside in disrepute and the attempts dubbed as failures, when an expert could have done but little better with the same materials.

I do not wish to appear presumptuous in classifying the bodies;

perhaps it is a matter of personal experience; but I have bought the different bodies, good, bad, and indifferent, as they were put on the market, until I have "bodies to burn," nevertheless I find that I always set aside the lower and return to the higher. The question of the grades of bodies has been thoroughly threshed; it has come up from time to time in convention, and can only be settled to the satisfaction of each by his trying for himself.

I have seen many dentists fusing the porcelain body by the watch, which explains many failures. This rather amuses the expert, as porcelain, like dough, can be overbaked. It should be governed by the eye, as the different conditions, if only slight, would change the time of fusing. The pressure of the gas is not always uniform, and thus the fusing-point in the furnace varies. The size of the piece being fused must also be taken into consideration, especially if electricity is employed.

The furnace is a matter of mere choice, as a high-class one should be able to bake the higher-grade bodies as well as the lower, and *vice versa*, it being only a matter of degrees of heat. I mention gas, electric, and oil as the furnaces to choose from; having each in my laboratory, I can speak with more assurance as to their merits. Although the old coke furnace has done and does do its work, it has become obsolete for minor operations; besides, it makes the climate too hot for the "white man." Of the three furnaces mentioned, personally I could best dispense with the electric, although it is the one I should advise a beginner to obtain, as having the advantage to him of being sure in fusing without gassing; besides, it is clean and noiseless, and throws out little heat. Its principal objection is the loss of time in fusing and the liability of the wires burning out, which are not quickly or easily repaired.

The oil furnace is a novel invention of Dr. Land, of Detroit. It is designed more particularly to fuse the larger pieces, such as continuous-gum work, giving reliable and perfect results, as will be seen by these samples. For those who are not acquainted with it, the diagram will show the scientific manner by which the inventor produced such a tremendous heat by a simple method,—the natural draft of a flue.

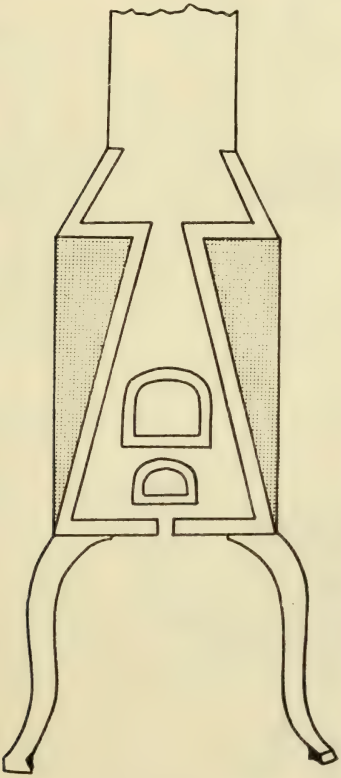
The concentration of heat, as seen in the common blow-pipe, is brought to a point of focus by injecting a jet of air into or through the body of the flame. It is a fact with the blow-pipe that the air passing through the flame becomes superheated as it travels on its course, and thus reaches its highest ignition at the point of focus, which is exceedingly sensitive, and slight variation in air pressure alters the degree of temperature; that is why it is so difficult to become an expert in the use of the mouth blow-pipe.

Fig. 1 on the diagram represents the general appearance of the combustion chamber, which is expanded at the bottom and converged at the top, and shows it connecting with a second chamber.

The combustion in the chamber is perfect, which renders it safe from gassing. My muffle more frequently than not has huge cracks in it without any effect on the work, as you see by the samples that the shades are retained and brought out perfectly.

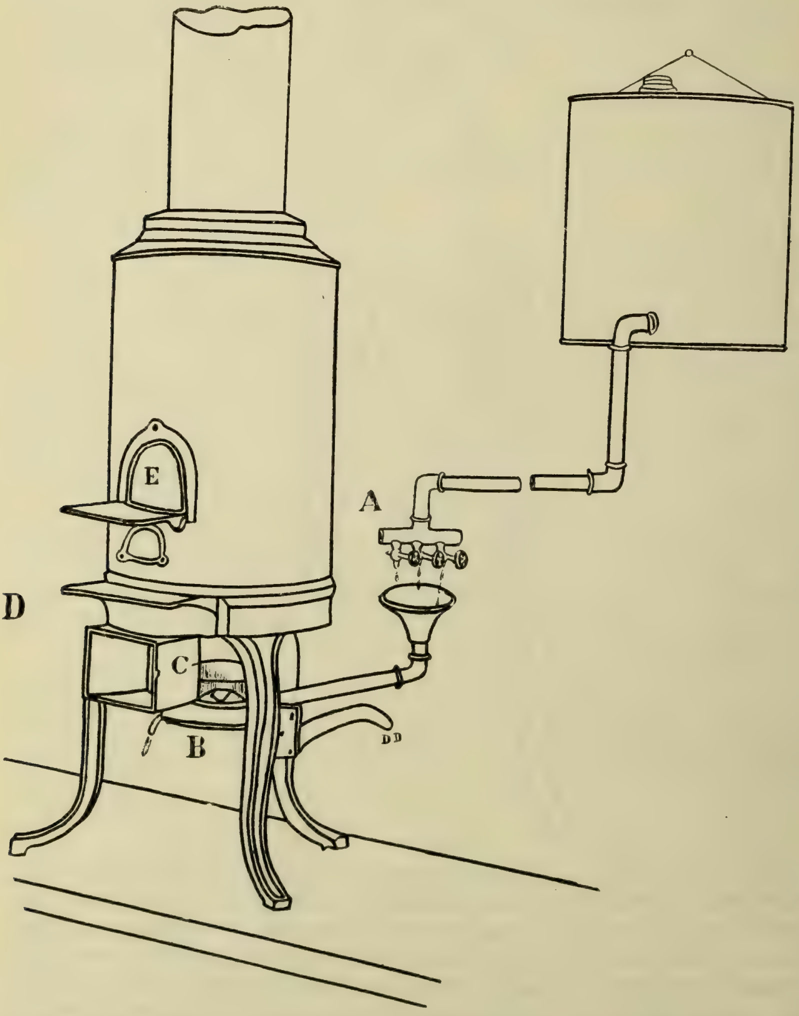
To illustrate the sensitiveness of the oil flame in practice, I find that a furnace of the capacity as shown in Fig. 2, when two hundred and ten drops to the minute maintains a muffle 8 x 3 x 2½ at a temperature of 2600° F., that an addition of thirty drops will bring it into exact focus and augment the heat 600 to 700 degrees, and, on the contrary, thirty drops less than the two hundred and ten will lower the temperature 300 or 400 degrees less than the standard of 2600° F.; or if an additional thirty drops should be supplied, making the total two hundred and seventy drops to the minute, this would also lower the temperature. From this it will be seen that a flame may be out of focus either from want of fuel or from excess of fuel, and that in either instance the temperature falls; and that an exact focus in a combustion chamber is equal in importance to that of a blow-pipe in giving the highest degree of heat.

FIG. 1.



The gas furnace in my laboratory is also one of Dr. Land's, Midget size, which has been in daily use since 1890 without change or repair, and bids well to be so another decade. It contains a seamless iridium muffle, which has given perfect satisfaction; whereas if the thinner platinum ones are used one is in constant trouble from either burning through or gassing. Yet if there is perfect combustion of the gas and air mixture there is little chance of gassing; a practiced eye and ear will at once determine the fact of perfect combustion following the lighting after the turning on of the air-pressure pump. The heat will be up and porcelain fused in less than three minutes. This class of furnace may have an objection in the noise that accompanies it; therefore its place is in the laboratory, although it is very entertaining to patients, who often ask to be shown the *modus operandi.*

Fig. 2.



In summing up: Any furnace will be satisfactory, be it electric or gas, oil or coke, if the operator becomes acquainted with it before he throws it out in disgust. To me the furnace is a part of the laboratory, just as much as the vulcanizer; and if I could carry my wish I would take it in preference, for what class of artificial dentures compares in the great majority of cases to continuous-gum? It gives the artistic operator a chance to display his knowledge of art in the reproduction of nature in both the teeth and the gums.

Modern artificial dentures consist largely of vulcanite, which in itself is invaluable to us as dentists. Yet to such an extent has vulcanite, by reason of its cheapness and ease of working, superseded other materials demanding greater skill and art in their manipulation, as to have retarded the higher developments of prosthetic dentistry and done much to divest our vocation of the dignity which belongs to a profession. Continuous-gum dentures are not only the most artistic, but are the most cleanly of all artificial dentures. The base, composed of pure platinum, is entirely uninfluenced by ordinary chemical agencies; its purity is the personification of cleanliness. There are no interstices in which food débris or secretions may find lodgment and become offensive through subsequent decomposition. Worn for many years, the piece when scrubbed is practically as clean as when it came from the furnace.

The artistic part of these dentures is brought out by the operator who is able to give any configuration to the body, and to restore to a degree limited only by his skill and art any loss of gum and palatal contours. When the palatal aspect of the piece is exposed, its artificiality is not noticed, as when dentures are constructed upon other bases.

The most important use of porcelain and the furnace in the dental laboratory is in the art of crown-work. It is a well-known fact that an imitation always suffers by contrast with the original. This, I am forced to say, is too often what happens in replacing artificial crowns. Too many operators there are, endowed with only a fair amount of mechanical skill, who by continued practice are able to place upon a root an apology for a crown, which, as the Dutchman would say, is "good for strong," but that is all the credit due to it. There is no reason in my mind why, when replacing a crown, one cannot conform more closely to the unison of nature, combining practical utility with the esthetic. An anatomical crown or cap is not even aspired to by many, they being satisfied to cover the root, say of a molar, with gold without pretense to contour to the adjacent teeth, leaving a condition that is a nuisance to the wearer.

Porcelain comes to the rescue as an ideal method of replacement of the lost crowns of teeth in conspicuous places. It having the required strength, the operator can restore the desired effect according to his ability as an artist.

The advantage of porcelain crowns (made by an operator) over those of gold, or even those combined with gold and porcelain, is obvious. Take, for instance, the ordinary every-day post crown. After the face of the root has been trimmed to the proper shape, an iridium post is fitted into the enlarged canal, the depth of the canal marked on the post, and a disk of pure soft platinum, No. 35, slightly larger than the face of the root is punched in the center, the post forced through to the mark, and soldered with pure gold. This is inserted into the root-canal, and the disk burnished and trimmed and burnished again, leaving a margin on the palatine half to form a band. Now, this absolutely fits the face of the root, which is next to an impossibility with a made-up porcelain crown, such as the Logan, etc. And I also claim that a porcelain crown made in this way has an advantage over similarly constructed crowns made with gold backing, in that one is able to more closely imitate nature in shade, position, and shape. How difficult to make a natural lapping incisor with a gold backing! Then, again, the shade is often disappointing, as the backing makes it a matter of speculation. But with a porcelain crown the shade can be changed by the aid of mineral paints and burnt in, thus bringing about an exact shade, sometimes impossible to get in a ready-made facing. Time is a consideration to most of us, as time saved is money to the dentist; and, after all, this is what we are after. So time is saved in making your own porcelain crown, as one can be made in less time than it takes to go down town to get one of the Logans.

I must speak for the strength of the porcelain crowns, as I think it is an erroneous impression that they are delicate and need protection. I have watched them take the strain of mastication for many years. It seems to me they are stronger than the porcelain facing with gold backing. In the one case the facing is etched to the solid porcelain body of the tooth, practically making the facing and body one; whereas in the other the facing is relying on two little pins, which in soldering are very frequently invisibly checked around their heads, and are liable to be easily forced off if not protected by unsightly gold tips, which are by no means artistic.

Perhaps one of the most satisfactory porcelain crowns is that we call the "jacket" crown. It is especially adapted to broken-down incisors and bicuspids where the pulp is intact, and most especially in covering the "peg-shaped" laterals. These "jackets" have proved to be very durable crowns, and have the advantage of enabling one in case of death of the pulp to enter the pulp-chamber without removing or injuring the crown. The record of this crown has, in the past twelve years of my practice, won for it a place that no other single crown can occupy. It has come to my rescue in roots fractured far under the gum (broken by hockey, lacrosse, and football); roots badly decayed and under the gum, and most particularly has it been my friend in the wholesale crowning of teeth where it is necessary for the salvation of the pulps. The samples I have passed around will show this form of crown. I will not burden you with the technique of this crown, as it has been in print many times.

I have many cases of this wholesale crowning system, models of which would no doubt interest you, but have made diagrams of only two cases, which have been of long standing, and of which, as I have seen them recently, I can give an excellent report.

Fig. 3 represents the case of a young lady at the age of nineteen, who came to me in 1891 from a neighboring city. The upper centrals, cuspids, and right lateral were very badly pitted and out of position. The left lateral was lost by extraction some years previous. The upper incisors and alveolar process protruded so much that the patient could only close her lips by forcing them, the space from non-occlusion causing a very decided lisp in the speech. The first bicuspids were removed; the arch was spread sufficiently to properly occlude the molars and the remaining bicuspid on the left side, and this was followed by slight but constant pressure on the cuspids and incisors, thus closing the space made by extraction, also reducing the protrusion, bringing the upper and lower nearer a cutting surface. After obtaining these results a retainer was used for a time to insure position, after which the teeth were prepared and covered with porcelain jackets, as in Fig. 4. The remarkable feature of this case is that devitalization was not resorted to except in the right central, which was more prominent than the others, thus requiring more trimming to make the arch a uniform contour.

FIG. 3.

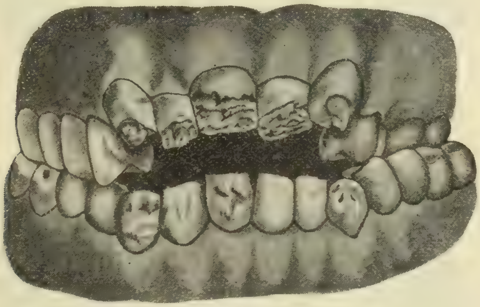
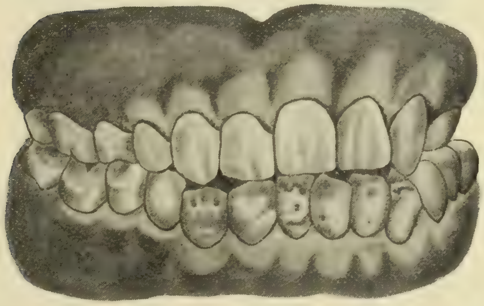


FIG. 4.



A younger sister of this patient had similar defective teeth, which were covered with jackets about the same time, saving all the pulps. The teeth, being hypersensitive, were ground down under an anesthetic. Both these patients were seen last summer; no pulps have died, and everything was doing and looked splendidly.

Fig. 5 shows a case of extensive erosion. Patient in excellent health, but suffered from gradual loss of tooth-structure. This commenced five years prior to the operation, which was in April of 1891. Biting and mastication were difficult and painful from the close proximity of the pulp to the surface. The jacket crown was again used in this case with excellent results, as shown by Fig. 6.

I think you will agree with me that a short bite bicuspid crown is a very difficult one to handle. It requires to be strong enough to resist the force of mastication, as well as have an artistic appearance.

The ready-made porcelain crowns, such as the Logan, Bonwill, Gates, etc., are all weakened by dowel-heads or holes, which are placed in the weakest part of the crown. The natural bicuspid is prone to fracture more than any other tooth, by reason of a deep sulcus and a long interlocking cusp; such teeth when filled are weakened, and more liable to fracture.

FIG. 5.

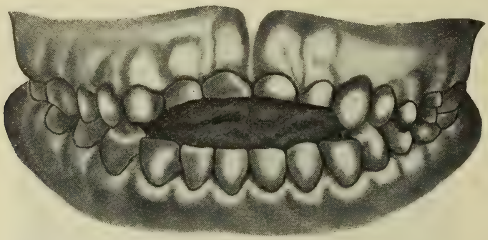


FIG. 6.

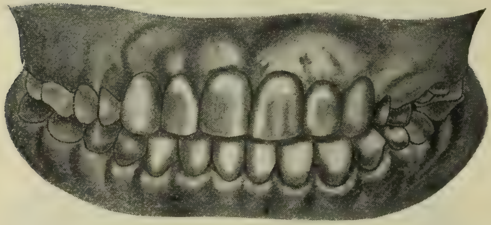
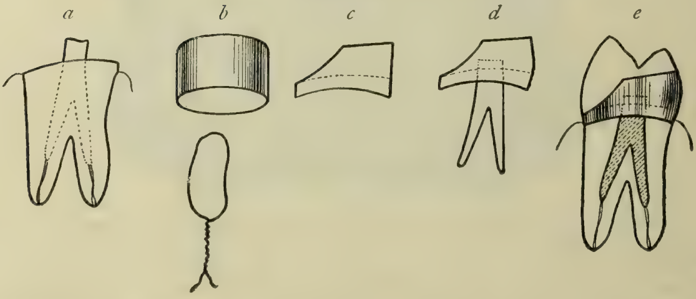


FIG. 7.



The jacket crown meets a great number of these cases, but where the root is a fairly good one, and the pulp not intact, I consider a crown I call the "cup" crown the most powerful, and yet it has an artistic appearance. Fig. 7, *a, b, c, d, e,* will give an idea of it. It is a collar crown, with or without a dowel, but having the band sufficiently wide to form a cup for the porcelain, which gives additional strength to the crown and does not take from it any artistic effect in imitating the natural one.

A great many porcelain workers in making a crown connect the pins of the invested facing with solder to the dowel or some other part. This to me is entirely unnecessary, and I cannot see the object of doing it. In fact, the pins are a detriment, as a facing with pins will fracture (with the shrinkage of the body or in the heating or cooling) just across the pins. Veneer facings are manufactured for this work, which save time and the trouble of having to entirely grind out the pins to form a proper veneer, and which seldom give trouble in checking. Again, many operators seem to be afraid of grinding the labial surfaces of crowns for fear of destroying the lustrous surface of the facing. That is just what I often like to do; I grind and mutilate (so to speak) until I have obtained the desired shape. It is then made smooth with fine sandpaper and put on a buff of cotton batting, using pumice first, then whiting, which brings a gloss more in keeping with the adjoining natural teeth. If the highest grade bodies are used the gloss can be reproduced by subjecting to high heat in the furnace, but where the medium or low-grade bodies are used you would destroy the contour of the crown before the gloss could be obtained, as all vitreous masses under high heat take the spherical form. The color would also be gone, and appear like translucent glass.

The use of porcelain for inlays seems recently to be attracting unusual interest in the profession. For the past eleven years I have been working and experimenting with this branch of porcelain art, keeping a close record of successes and failures,—I am sorry to say too many of the latter, for nothing would please me more than to find that the "ideal" was porcelain. I have listened to essayists pouring forth the virtues of porcelain, placing it on a pinnacle as the ideal filling, "giving infallible results and absolutely perfect in every detail." I have listened to and have read their sweeping testimonials in favor of porcelain inlays, and felt that they were doing an injustice to their patients, to themselves, to their listeners, and to the system of inlaying. Two or three years' experience may make a man satisfied with himself as an expert, but it does not make porcelain the ideal filling until it meets all the requirements of a true standard and the universal confirmation of the profession.

I do not wish to give an unfavorable impression of porcelain inlays, for they have a place, but the instances of their use are fewer in my practice than ten years ago. The failures attending this class of porcelain work are not due to the filling itself, as porcelain has a great many of the requirements of an "ideal" filling. It has the possibility of shading. It can restore the contour. The texture is sufficiently strong. It is easy of manipulation. It does not disintegrate or change in form by saliva. It is a poor conductor of heat or cold. It fills the bill for nervous patients and invalids, where the working of gold is next to impossible. It is particularly adapted for soft teeth where another dentist has failed with gold, and you come to the rescue with porcelain. If you follow in the footsteps of your neighbor you also may fail, as he may be just as good a gold operator as yourself; but, in the fact that you have done something different which also pleases the eye, and have caused but little or no discomfort, with the chances of as good success, for "a good porcelain inlay is eminently better than a poor gold filling," you have accomplished at least one thing that counts in your practice,—you have pleased the patient.

After this plea for porcelain inlay, wherein lies its weakness? It is in the material which connects the porcelain to the tooth; the "cements" are at fault. I was pleased to see the subject of cements brought up before the National Dental Association last August in a paper read by Dr. Wedelstaedt, in which he showed by demonstrations and his investigations that the cements for which we pay large prices are a miserable failure for their intended purpose. This is a subject that requires attention both by the manufacturers and the scientific workers along this line.

Our amalgam work in the mouth was in a similar state, our failures staring us in the face every day,—we gullible dentists paying handsome prices for alloys giving no better, if as good, results as the "homespun" of forty years ago. We must thank such scientific men as Dr. Black for their persistent efforts, as in his experiments and agitation, for the improved alloy to be had to-day.

True enough, cements under different environments and conditions give different results. I have seen large cement fillings on the morsal surfaces of molars doing service for fifteen or twenty years without a perceptible disintegration, and seemingly as hard as flint. If we could rely on this kind of results in all mouths, the porcelain inlay would be the Mecca of fillings in conspicuous places, as you can get nearer the shading, transparency, and density of the tooth than with any other material. The consistence of cements in mixing has no doubt a great deal to do with the durability. Thus of late I have been tempted to leave my old reliable "Justi" cement for inlays, because of its quick setting; whereas in using the Harvard the mixture can be given more body by a greater amount of powder, and the inlay can be pushed into its place without the granulation forming before the inlay is home, as very often happens with a quick-setting cement, when it is most annoying to be compelled to remove the inlay, scrape and wash out every particle of the cement, and try again.

With no better cements than we have I shall continue to put in porcelain inlays, because there are many who demand it, even if they are liable to require replacing in three, four, or five years. It has gained for me a reputation which I have to sustain, and those inlays which give way from time to time will no doubt be replaced in porcelain if in conspicuous places; but my experience has taught me *discrimination,* which should be a password to those ardent in first love.

"Permanent filling" is a definition in itself, and I am quite certain that we cannot as yet put porcelain inlays in that class, as they are limited by the success of the cement, which is itself classed as temporary.

In reviewing my record books on inlay work as food for this paper, I find the cavities on the labial surfaces of the incisors and cuspids, and also those at the gum-margin, are in the best state of preservation. The cements in the majority of cases have dissolved out more or less, but this does not seem detrimental to the tooth. In approximal cavities where the joint is at the gum-margin, the cements dissolve more rapidly, and recurrence of decay is sure to follow. The best results of any inlay are found in those which were done by the "How" system of trephining a cavity, and grinding the inlay in revolving motion. But this inlay, which is absolutely perfect as inlays go, has allowed the cement to dissolve out, and in some cases a slight dark line is shown by the infiltration of the saliva.

I have corners, contours, tips, and cusps in all stages; some doing only fairly well, others better,—depending entirely, of course, on the action of the saliva on the cements. I must say, however, after seeing some of the inlays that were put in eight and ten years ago still preserving the tooth and looking well, it is encouraging enough to continue the inlay process where properly indicated, in hopes of an insoluble cement being discovered. At any rate, it is well that one should be up-to-date and able to cope with the different requirements of the public, satisfying himself that his efforts are equal to the position he holds in the mind of the patient, whose interest should be paramount to every other consideration, and who should be given accurate information as to the applicability of the porcelain to his case in respect to appearance and durability as compared with gold and other fillings.

Will it last as long as gold? This question is invariably asked, and is a sticker when the cavity indicates porcelain and you have made a plea for it, your inclination at the same time being toward gold as the paragon filling for durability.

Some weeks ago I received a telegram from a lady (residing in a city in this state) asking an appointment to have replaced a large contour of porcelain which I had made some five or six years ago. On examination I found the enamel of the tooth badly broken, which made it necessary to remove the porcelain piece. Many questions were asked and answered as to the "pro" and "con" of porcelain and the relative merit of gold, the matter finally ending in the contour being made in platinum and gold as being the kind to meet the requirements to the satisfaction of both dentist and patient. It was most difficult to retain a porcelain filling in position, the large contour, on the mesial side of a central, having little or no depth to it, the pulp being intact. The lymphatic temperament of the patient gave a square occlusion to upper and lower incisors, which consequently had worn to a broad biting surface. There was also an approximal cavity on the distal surface, but not conspicuous. The porcelain was made for the mesial cavity. A groove was made in the remaining cutting-edge, and a thread-like platinum wire, baked into the inlay, ran along the floor of the cavity or groove on the cutting-edge and into the distal cavity, being built over with gold, and the cutting-edge shod to protect biting off the porcelain as well as the tooth.

The method I employ is to use a platinum matrix and high-grade bodies, but the system has been explained in detail so often that no misstep could be taken by a beginner if he tried. The samples that you have in hand will show a few inlays made from different makes of bodies. I did not pretend to match in color the bleached tooth, but the jointing will compare favorably with what is found in the mouth. And those joints will allow the cements to dissolve, which gives to an inlay a limit of durability governed by the action of the saliva in the different mouths.

It seems to me there is only one way to get a proper matrix for an inlay; that is to burnish the metal, be it platinum or gold, into the cavity, which should have some depth, and not to apply merely a thin veneer, as some suggest. I see no advantage in trying to take a "perfect" impression of the cavity, whereby the matrix is made out of the mouth; it is a great loss of time. What better does one want than the tooth itself, with the true hard edges of the cavity to form the matrix against? You have gained nothing in going about trying to procure a duplicate of a cavity you already have at hand. One soon learns to remove a matrix without changing its form. One thing is certain, if there isn't space to get the matrix out freely you cannot get the inlay in when made. Some workers in porcelain inlays advocate the filling of all undercuts with oxyphosphate, waiting until it hardens, and then make the cavity so the matrix can be got out very easily. In my working I have always relied on perfecting the edges of the matrix after having made a biscuit, which strengthens the matrix and allows it to be held and the edges burnished perfectly. In large contours I rather prefer to have an undercut at the gum-margin, as it gives body to the filling, and everything helps as a retainer. With a little practice one is able to get the matrix down into a groove. With a platinum matrix it matters little if the metal should break through while burnishing, as the porcelain will bridge over the break and the inlay finish just as perfectly. It is sometimes necessary to retain a small corner on an incisor by forming a groove at the base of the cavity, and a staple of platinum wire is pushed through the bottom of the matrix and held in position with a little dampened body, and the whole withdrawn from the cavity and baked. If something of this kind is not done the corner is liable to be dislodged with a very slight strain.

It is quite common as a saving of time to make the inlay with one burnishing, the patient being dismissed and the inlay made in his absence at the leisure of the operator, who would require an excellent memory to remember the details of a contour, as so often the matrix does not indicate the shape of the lost part of the tooth, and only by trying into the cavity can one obtain the exactness that is necessary to get the required result.

Although the uses of porcelain and the furnace do not stop here by any means, I feel that I must do so, before completely exhausting those who have been good enough to listen to my feeble attempts.

CONCLUSIVE EVIDENCE IN RELATION TO JUMPING THE BITE.

BY RODRIGUES OTTOLENGUI, M.D.S., NEW YORK, N. Y.

(Read before the New York Odontological Society, April 17, 1900.)

In November last I read a paper before the First District Dental Society entitled, "Is it Possible to Jump the Bite?" This paper was published in the DENTAL COSMOS of February, and in the March issue of the *International Dental Journal* Dr. Eugene S. Talbot makes a rejoinder, his conclusions being that it is not possible to jump the bite.

In the course of his paper he says, "This article appeared to me at first to be merely a practical joke. Turning to the discussion, I was astonished to see that it was seriously considered by the members of the First District Dental Society." And later he adds, "The joke appears to be not only upon Dr. Ottolengui, but also upon the members of the First District Dental Society."

In a discussion of jokes Dr. Talbot should remember the old saw that "he laughs best who laughs last," and I wish to assure the members of the First District Dental Society that no joke whatever was perpetrated. An analysis of Dr. Talbot's article would show that he is not very complimentary to the profession of this section nor to myself. If I have presented a paper claiming to have performed a certain operation, and it be true, as Dr. Talbot asserts, that I did not accomplish any such result, one of two things must be admitted: either I knew that I was deceiving my audience, or else I deceived myself. In the first place I am dishonest, and in the second I am incompetent. Is there no chance, however small, that Dr. Talbot may be mistaken, and that perhaps after all I neither deceived myself nor my hearers, and that the joke, if joke there be, is on Talbot instead of Ottolengui? At least he admits that since 1892 he has tried three times to jump the bite, and has failed. If he has failed, is there not a suspicion that perhaps after all he may not know all there is to know on this subject, and that he might possibly have something to learn?

After a few random remarks as to the etiology of the condition, during which he asserts that I am entirely ignorant, he finally reaches the question, "Did he jump the bite?" and then discourses as follows:

"A study of the illustrations is all that is needed to demonstrate that the doctor did not 'jump the bite.' By glancing at the two models, the single molar upon the upper jaw stands in precisely the same position in both models against the lower molars. If the bite had been jumped, the two second molars would have stood one upon the other. In other words, the lower second molar would have moved forward the width of a bicuspid tooth, which would have brought the two second molars together. The lower incisors would stand in front of the lateral, instead of behind, as shown in Fig. 1. What has taken place in correcting this deformity? The upper incisors, cuspids, and bicuspids have been carried backward the width of a bicuspid tooth. The space where the superior first permanent molar has been extracted has diminished in width. This has been brought about by the second bicuspid standing behind the second bicuspid upon the lower jaw, instead of in front of it. The first bicuspid and cuspid have also dropped backward the width of one tooth. This has given room for the incisors and alveolar process to be carried back into a normal position. It is apparent to every one that the lower jaw could not be carried forward the width of a bicuspid, and the upper incisors and alveolar process have been carried backward. Only one operation has been accomplished. It is easy enough to see which of the two movements has taken place. The location of the bicuspids before and after indicates this; the location of the incisors and anterior alveolar process before and after settles that question. It will be seen that just the opposite was accomplished from what the doctor intended. The upper teeth were moved backward, instead of the lower jaw being carried bodily forward."

Fig. 1.

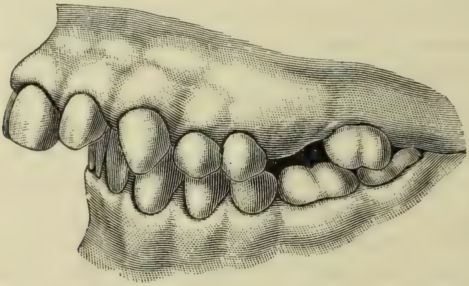
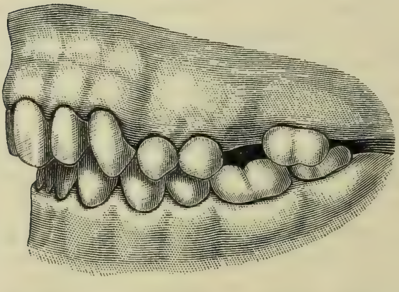


Fig. 2.



Several friends have written to me making the point that I did not jump the bite, because the three molars shown in the illustrations (Figs. 1 and 2) are in the same relative positions at the end as at the outset. Dr. Talbot, however, is the only one who noted the diminished space between the upper molar and the upper second bicuspid. Having noted this, he should have been able, as a great specialist, to have discerned the truth, rather than to have made the error of utilizing a false argument with which to bolster up a false premise. Being obliged, however, to explain this diminished space, he tells us that this diminution has been "brought about by the second bicuspid standing behind the second bicuspid upon the lower jaw, instead of in front of it." Very good, but how has this been accomplished? Dr. Talbot says "the upper teeth have been moved backward instead of the lower jaw forward." That is, the space between the molar and bicuspid on the upper jaw has been lessened by the retraction of the bicuspid, the molar, to substantiate his claim, having remained in identically its original position.

Now, I have two questions for Dr. Talbot: Will he kindly describe an apparatus with which this result could be accomplished, and if he can do that, will he tell us how such a result could have been reached with the device used and figured by me? For what must I have done to meet this extraordinary proposition of Dr. Talbot's? I must have used a twelfth-year molar, the sixth-year molar being absent; and with this slight anchorage I must have moved backward a central incisor, a lateral incisor, a cuspid, with its long root, and two bicuspids, and all without moving that molar forward. Granting for a moment that I might have done this, one tooth at a time, utilizing the molar for retracting the second bicuspid, and, after waiting for this bicuspid to become solid in the jaw again, to have used the two wherewith to move the first bicuspid, the operations being renewed for each tooth after waiting for the fixation of the moved teeth; granting that such an unusual method might have been adopted, we still have the fact before us that nothing of the sort was done. The retraction of the anterior protrusion was attempted with a well-known apparatus which operates to retract the four incisors and two cuspids simultaneously. Suppose that no effort had been made to prevent the lessening of the space between the second bicuspid and the second molar, and supposing that this space and the marvelous rigidity of that molar allowed the reduction of all the anterior teeth, what does Dr. Talbot imagine occurred on the opposite side, where no teeth had been lost?

But let us leave Dr. Talbot's theories and inquire into the facts. What did occur here, and how is it, if, as I claim, the bite was jumped, that the molars are relatively in the same positions before and after?

As a matter of fact, then, it is true that after retraction of the anterior protrusion the upper second molar was still occupying the same position as at the outset. I had no idea that a molar standing alone could be utilized as an anchor unless supported. Consequently the plate which carried the retracting spring wire passed snugly between the molar and bicuspid, the possibility of lessening this space being further prevented by rigid clasps attached to the plate, one passing behind the bicuspid, and the other in front of the molar. Thus there was no more possibility for this space to be lessened than had there been a first molar standing between the teeth, as there was on the opposite side of the jaw. Therefore, after the retraction of the anterior teeth both the molar and bicuspid were in identically the same position as at the outset; the molar had not been drawn forward, nor had the bicuspid been carried back. But, leaving the molar for a moment, Dr. Talbot admits that the bicuspid is in a new relation with the lower jaw, even though the molar apparently is not, and he accounts for this by claiming that the bicuspid has been moved back. Now, will he tell us when this happened? Surely not while the metal plate and two stout clasps held it apart from the molar. Has it dropped back since? By what means? Will a simple retaining wire passing around an arch operate to retract teeth even as far back as the bicuspid region? If so, these cases are forever simplified. In the future we shall need only to apply a plate, carrying a wire around the protruding teeth, and leave the rest to Providence and prayer.

I have said that when the retraction had been completed the molar was in the same position as at first, having been kept in place by the plate. The next step was to jump the bite. Now, it does not at all follow that when jumping the bite occlusion is instantaneously perfected. It must be borne in mind that all of the jaw in the case under discussion had been widened, except across the molar region, the widening having been greater anteriorly and less as we approach the back of the mouth. When I asked the patient to close her jaw in the anterior pose which I desired, I noted that the occlusion with this molar slightly opened the bite. When the biting plane was added to the original plate, which was utilized as a retainer, the clasp was removed from around the molar, the portion of the plate which had passed between the molar and bicuspid was cut away, and the new retaining wire was attached on this side to the bicuspid clasp. Thus the molar was left free to move forward. The illustration which has caused so much discussion was made from models of the mouth two years after the case had been dismissed, and in this time not only has the molar moved forward, but it has been forced into correct occlusion with its antagonists, which is almost exactly as at the outset. There is more difference than has been indicated by the engraver, but the illustrations are quite sufficiently accurate.

So much for the question of these molars. But there is another point of view, which naturally has not been taken by my critics, because all of them admit that they have never jumped the bite. Having never done this, it is quite natural that they should be unfamiliar with the various stages of the operation. Dr. Talbot has taken my illustrations and discussed them as though by some means I had retracted the upper jaw to its final position, and that my notion that the bite has been jumped is merely a theoretical explanation of present conditions, rather than an operation entirely separate and distinct from the retraction. He does not realize that the retraction of the jaw was continued for a certain time, and that after that no forces were in play which could further reduce the jaw, while if a simple retainer had been applied the upper jaw would still have appeared prominent. That is to say, I assert that in this, as in other cases, I reduced the upper arch only to what I conceived to be a normal pose in relation to the external profile, and that had I left the mouth as it then was the upper incisors would have been prominently in front of the lower. Therefore, in looking at the final result we need not examine the molar region at all, for there we are likely to be misled by changes which occur to perfect occlusion. Let us look at the occlusion in the incisive region. In the case under discussion, when the retraction had been finally concluded, the lower incisors occluded back of the upper incisors, whereas in the final models shown, and, better still, in the mouth of the patient, who was exhibited to the members of the First District Dental Society, on whom my joke was played, the incisors of the lower jaw were antagonizing in sharp contact with those of the upper.

I will make this point clearer still by introducing charts used in connection with the two cases reported at Niagara, and published in the Dental Cosmos and in the Transactions of the National Association. Considering the criticism which the last illustrations have elicited, it is quite singular that so little has been said about these two cases, in connection with both of which I claimed to have jumped the bite. Fig. 3 is the original condition of one of these cases. Fig. 4 shows the occlusion after the retraction of the upper jaw, and I call attention to the fact that there is still an apparent protrusion of the upper jaw. Since the teeth were brought to this condition no force whatever has been applied which could possibly further reduce the upper arch. The bite was then jumped, the resultant occlusion being shown in Fig. 5. Temporary teeth are still present here, and therefore it is interesting to examine Fig. 6, which shows the occlusion after the eruption of the permanent teeth in the upper jaw. Now, what do we find? That there is no protrusion of the upper jaw, apparent or otherwise. Arguments based on the posterior occlusion in this case, if any can be found which may be utilized to antagonize my claims, will have no weight with me so long as the antagonism of the incisors is not explained by some means other than as I explain it, by jumping the bite.

I desire to-night to introduce the models of another case, recently completed, the like of which has not yet been reported in our literature. This is an application of the principle of jumping the bite along lines which have not heretofore been set forth, though entirely in accord with the initial operation as described by Dr. Kingsley.

That this new case may be fully comprehended I will first explain more fully the principles which underlie jumping the bite. The necessity for jumping the bite is only secondarily related to the teeth themselves, the correction of the various malocclusions being possible without such resort. Jumping the bite is to be decided upon solely and only from a study of the external features, and deals primarily with the relation of the chin to the symmetry of the profile. As I have said before, I repeat, the lower jaw is in a retreated pose. By this I mean that a study of the profile will disclose that the chin is back of the position which it should occupy to attain the most symmetrical lines for the profile.

In relation to this retreated chin and lower jaw, we may have an upper jaw of three kinds: First, the upper jaw may be more or less prominent; that is to say, protruding beyond the lines which would be normally best to be in cosmetic relation with the upper portion of the face. This is the class of cases which has been so much discussed in connection with jumping the bite. I introduce a set of diagrams to make this clearer. Fig. A shows a profile in which the upper jaw is prominent, while the lower jaw retreats. To correct this by means of jumping the bite we first reduce the upper jaw till it occupies a position such as is shown in Fig. B.

Fig. 3.

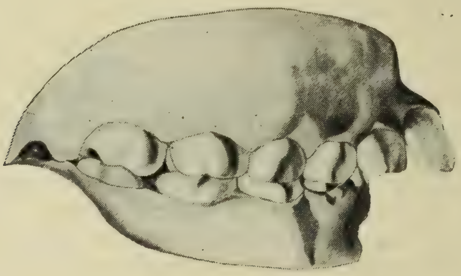


Fig. 4.

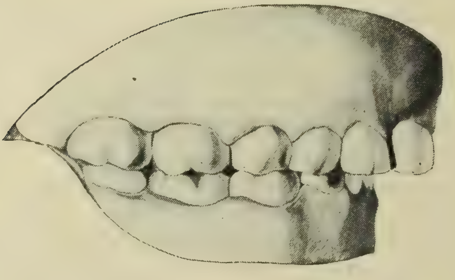


Fig. 5.

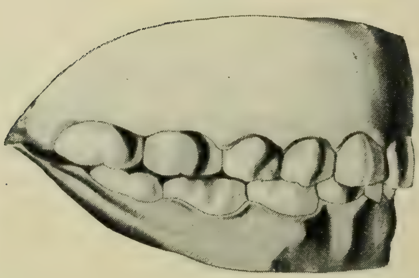
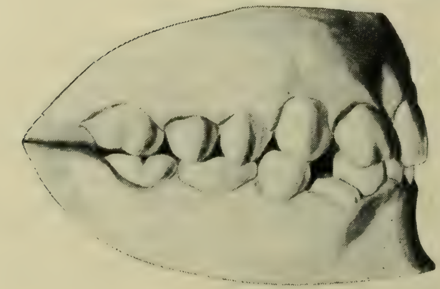
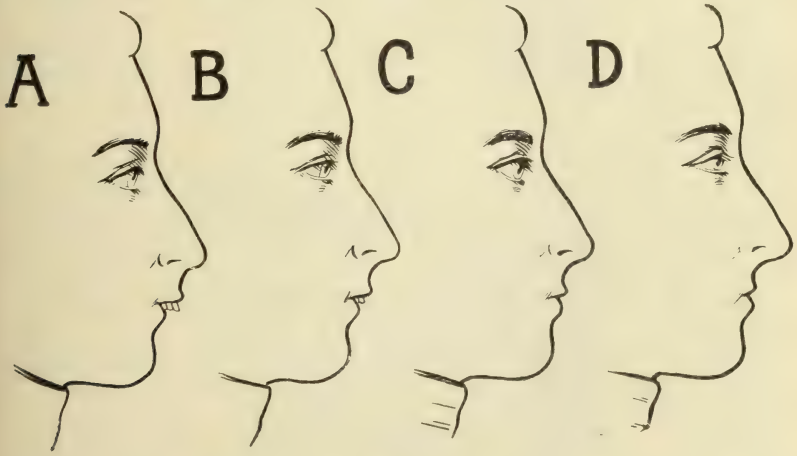


Fig. 6.



Here we see that the upper jaw still apparently protrudes; the truth, however, is that it has been reduced to normal, and the final correction lies in jumping the bite, whereby the lower jaw is brought forward to meet the upper, the resulting profile being shown in Fig. C. This is the operation devised by Kingsley, and I take the liberty of calling Fig. C the Kingsley profile. But Dr. Talbot says we must not attempt this, because it is impossible. What, then, must we do with these cases? Shall we carry the upper jaw back until we perfect our dental occlusion, with the probable requirement of sacrificing two bicuspids? If so, we get the result indicated in Fig. D. This figure, D, is identical with Fig. A, except that the lip has been allowed to drop down to meet the lower jaw, which we are prohibited to jump forward. What is the result? We apparently lengthen the nose, and give our patient a disagreeable angular profile. Or possibly Dr. Talbot, or some other specialist, would say that we might reduce the upper jaw to normal only, as in Fig. B, and then bring the lower teeth forward to meet it. But in bringing the lower teeth forward we not only must inevitably produce spaces somewhere in the arch, with disastrous results to the teeth themselves, but, what is worse, as we cannot change the pose of the chin by moving the teeth, if we simply carry the teeth forward, we carry the lip also forward, thus exaggerating the slant of the chin and producing a profile too evidently wretched for me to waste time in figuring.



This is the class of cases in which, as I have said, the jumping of the bite has been advocated in the past. A second class would be those where, in connection with a retreating chin, we have a normally posed upper jaw, which nevertheless appears to be prominent. Such a case would present as shown in Fig. B. If the arch is symmetrical, jumping the bite is all that is requisite. But most often this condition is found with what is called a V-shaped upper jaw, having the anterior teeth more or less twisted and malposed. What I consider to be the correct treatment would be to enlarge this arch to a symmetrical curve, allowing the proper placing of all the teeth, then jumping the bite. It is such a case as this which I will describe. The profile presents as in Fig. B. The jaw is enlarged sufficiently for straightening the teeth, and jumping the bite gives us the correct profile, Fig. C. If we are not to jump the bite we must extract in order to find room for twisting the teeth, and when the correction is made we would have produced the profile Fig. D. I wonder if Dr. Talbot would like to have this known as the Talbot profile?

The third class is rare, but I have treated such a case. The lower jaw, as before, is in a retreated position, but the upper jaw is also in a posterior position, the teeth consequently being crowded and jumbled into a state of crookedness which is discouraging to the operator. These cases come to us with an angular profile such as is shown in Fig. D. By removing the bicuspids it is possible to straighten all the teeth, but the profile would remain the same. A better way is to enlarge the arch, making room for straightening the teeth without extraction, but producing a protrusion equal to that shown in Fig. B. Then jump the bite, and we have a corrected, and I may say correct, profile, Fig. C.

To summarize these cases let me point out that whether they come to us as shown in A, B, or D, we correct without extraction, giving as a final result a jaw full of teeth and a profile as in Fig. C; this being accomplished either by retracting or enlarging the upper jaw and then jumping the bite.

Any other method seems to involve the loss of two bicuspids, and the production of an angular profile, as in Fig. D.

In the case which I now present a study of the profile convinced me that the upper jaw, though apparently prominent (as in Fig. B), was nearly normal so far as its relation to the profile was to be considered. A study of the full face indicated that the face was too sharp, and that it would be improved if the jaw were widened. This was done, and room was made for twisting the teeth into correct position. Of course, the prominence of the upper jaw still seemed to be present, but was corrected by jumping the bite. I exhibit models showing the original condition (Fig. 7), models showing the occlusion after expanding and correcting the upper arch (Fig. 8), and lastly models showing the present condition after jumping the bite (Fig. 9). Here we have quite the opposite of the case which Dr. Talbot has criticised. Surely this time he will not venture to claim that while widening the upper arch and carrying the teeth out into true positions I have retracted the whole set of teeth as much as is indicated by the models, which is the argument by which he explained my result in the other case. That this claim may be invalidated in advance, however, I must insist upon a consideration of the models (Fig. 8), which show the relative position and occlusion after the completion of my work upon the upper jaw, and the removal of all apparatus which could exert any force.

If the models of the upper jaw before and after correction be examined, and a line drawn from one molar across to the one on the opposite side, measurement would then show that the left central incisor is at the same distance from this line at the end as at the outset (Figs. 10 and 11). This shows that the diameter of the arch is unchanged. Consequently nothing whatever has been done in this jaw which could effect its present occlusion with the lower.

FIG. 7.

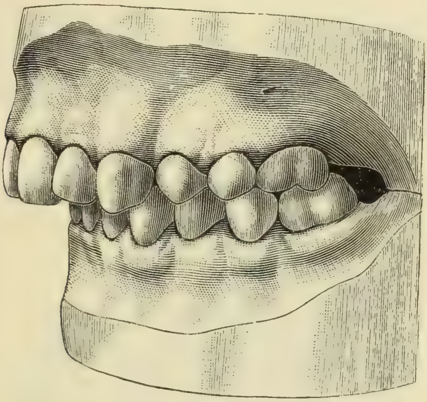


FIG. 8.

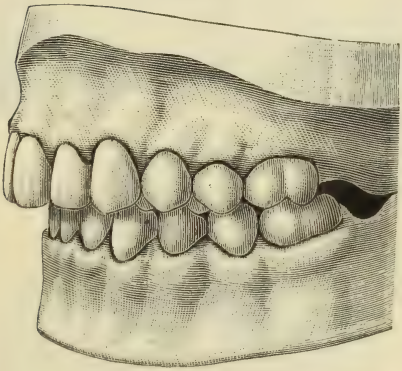
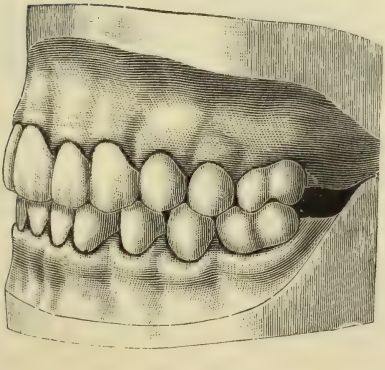


FIG. 9.



In the illustrations I have naturally chosen that side of the mouth which best shows the change in the occlusion occasioned by jumping the bite. I desire, however, to state very frankly that the result on the opposite side is not at present as good, but this is explainable by a curious fact in connection with this case. In the first place, the molars seen *in situ* are not sixth-year molars, but twelfth-year molars, a previous dentist having removed the sixth-year teeth "to relieve crowding," I suppose. During the progress of the work I met with unexpected difficulty in twisting the right central incisor, the mesial corner of which also required reduction. The difficulty arose from the fact that the anchor teeth seemed most loosely set in the alveolus, and the tension upon the central incisor, being of course also exerted against the molar around which the plate was clasped, operated to drag the molar forward, the strain driving the first bicuspid slightly up into its socket.

FIG. 10.

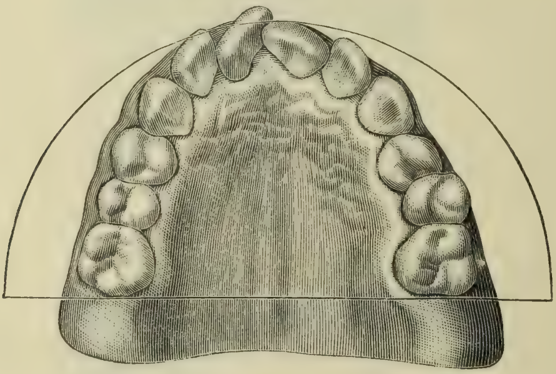
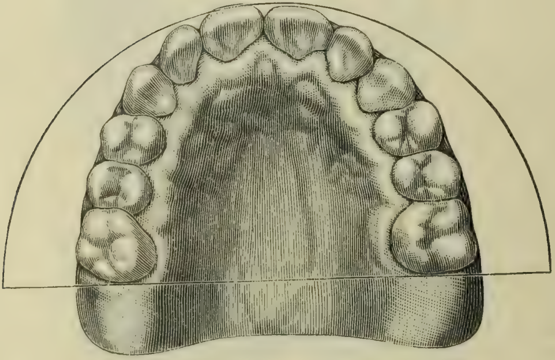


FIG. 11.



This explains why that molar is not occluding as well as the one on the opposite side. But I am using a bite-jumping apparatus which leaves this molar free; and not only is it rapidly falling back into place, but the bicuspid is likewise coming down, so that I have no doubt whatever that within a year the occlusion on this side will be quite as perfect as upon the other.

This patient is not one who would come to a public meeting.

But I trust that this discussion with Dr. Talbot is entirely impersonal, and conducted in the hope of learning and disseminating the truth. If Dr. Talbot wishes, I will with pleasure arrange that he may see this patient if he will stop in New York on his way to the meeting of the American Medical Association at Atlantic City this summer.

In conclusion, I have this to say in regard to jumping the bite: Not only is it possible, but it is in many cases the only true means of gaining the best result for the patient. Those who through prejudice or incompetency brush aside the operation, and get their results by sacrifice of useful dental organs and by further disfiguring the faces which should rather be beautified, do not render skillful service, and do not honestly earn the fees collected, however small.

SOME RECENT CONTRIBUTIONS TO THE STUDY OF DECAY OF THE TEETH.

BY W. D. MILLER, D.D.S., M.D., BERLIN, GERMANY.

My attention was recently called to a communication entitled "Micro-Organisms in Dental Caries," by Kenneth W. Goadby, L.D.S., in the June number (1899) of the Transactions of the Odontological Society of Great Britain, in which the author, while recognizing the "admirable pioneer work" done by me, characterizes my work as lacking method throughout, since in describing a new organism I gave perhaps two or three cultural peculiarities and nothing else.

This criticism seems to me to be not quite just, and perhaps uncalled for, in view of the fact that I have never undertaken to make a thorough study of the micro-organisms of dental caries. My first cultures were made before the extensive introduction of solid culture-media, by the old fractional method, and the succeeding ones were made on gelatin, as agar-agar was not in use at that time. I did not incorporate these experiments in my book on the "Micro-Organisms of the Human Mouth" for the reason, there stated, that I did not consider them "sufficiently extensive or conclusive."

Besides this, the work that I did from 1880 to 1890 covered such an immense field that it was quite impossible for me to attempt to make a thorough study of all the scores of different kinds of bacteria that came under my notice. I have myself repeatedly criticised my mistake in trying to do too much (*l. c.* p. 84). However, it was not at that time so much a question of classifying and thoroughly studying the different kinds of bacteria met with, but questions of a more general nature that demanded attention; and in my book and various communications in the dental journals I laid the foundation for as much work as all the bacteriologists in the ranks of the dental profession may be able to accomplish in many years to come. For reasons which I need not state here, I have not been able to take any part in the investigation of these questions since about 1893, in particular not being able to do any microscopic work; and have often been obliged to allow criticism and misinterpretation to remain unanswered. In Mr. Goadby's communication some statements are made which are not in strict accordance with facts, while several points are brought out without recognizing the fact that they were dealt with by me very many years ago, when dental bacteriology was in its infancy.

Mr. Goadby says, "The results, admirable as far as they go, were obtained with impure cultivations, thereby introducing one of the greatest sources of error with which bacteriological work is beset." I fail to comprehend this statement, from whatever point of view I look at it. Here in Germany the charge of working with impure cultures is looked upon as about equivalent to that of ignorance and incompetency, and is not made without very potent reasons. Apart from this, the statement is in general hardly accurate, and totally misrepresents me in particular.

Impure cultures or mixtures become a source of error only when they are dealt with as *pure* cultures, which I have been as little guilty of as Mr. Goadby himself. On the other hand, there is a possibility that there may be a source of error in pure cultures when we rely upon them alone for our knowledge of what takes place in the mouth under totally different circumstances. I have made many experiments in which the object was to imitate as nearly as possible the conditions in the human mouth, or where it was designed only to determine what takes place in mixtures of saliva with various foods. Here I should hardly call it a question of cultures at all, either pure or impure, and, at any rate, there is no particular source of error in the fact that there are various kinds of bacteria in such mixtures.

Again, in answering the question which I first put, "Is caries the result of bacteritic action?" as well as in my experiments for producing caries artificially, I attempted to imitate the conditions found in the human mouth, where we never have pure cultures. I did not assume to be working with pure cultures, and there was no source of error resulting from such an assumption. No one understood better and applied the principle of pure culture more strenuously than myself, and where the attempt was made to determine any point relative to the biology of a particular organism—in other words, where pure cultures were called for—I invariably used pure cultures. In this connection I may further state that I also produced artificial caries more than seventeen years ago by the action of a pure culture of a pleomorphous bacterium (see figure here reproduced), as described in the *Independent Practitioner* for March, 1884.

Aside from these facts, I am not aware of a single error in my work which may be accounted for in the way suggested by Mr. Goadby.

Mr. Goadby's statement that I have relied upon morphological differences alone for determining new organisms is equally inaccurate.

In some of my earliest communications I expressed the opinion that only acid-producing bacteria are to be found in the deepest portion of carious dentin, whereas, more superficially, both such as produce acid and alkali might be present, a view which seems to be confirmed by the investigations of Mr. Goadby, though further experiments are necessary to definitely clear up this point. I very naturally, as it appears to me, recognized two stages in the process of caries of dentin,—one of decalcification, and one of solution of the decalcified tissue.

The point has also been repeatedly brought out by myself and others that among the bacteria concerned in the causation of decay of the teeth there are some which produce acid, some which liquefy the decalcified dentin, and some which do both. The relation of pigment bacteria to the discoloration usually associated with decay has also repeatedly received attention.

Mr. Goadby's classification of the bacteria of decay of the teeth into (a) bacteria which produce acid, (b) bacteria which liquefy blood-serum, and (c) bacteria which produce pigmentation presents, therefore, virtually only an indorsement of pioneer views. In my opinion, however, any attempted classification of the bacteria of decay of the teeth, to be complete, would have to be extended so as to contain a rubric for bacteria which both produce acid *and* liquefy blood-serum, a class which undoubtedly has representatives in the mouth, and to which Goadby's yellow bacillus must be considered to belong, since it produces "well-marked acidity" in milk and also liquefies blood-serum.

Furthermore, if we were to consider pigmentation as an essential feature in caries, we would require rubrics for those which produce acid and pigment, for those which liquefy blood-serum and produce pigment, and for those which possess all three properties, as does the yellow bacillus.

The classification is also not quite fortunate in introducing blood-serum as a criterion of the digestive power of bacteria for dentin, since nothing short of cultures on dentin itself will ever absolutely prove whether a particular bacterium has the power to digest dentin or not. For this reason the pioneer classification of bacteria of decay into (a) bacteria which produce acid, (b) bacteria which liquefy the decalcified dentin, and (c) bacteria which both produce acid and liquefy dentin appears to me to be more to the point than Mr. Goadby's. Again, in testing the power of a bacterium to liquefy decalcified dentin, we should put it under conditions as similar as possible to those found in the mouth, since a bacterium which does not liquefy dentin out of the mouth might do so in the mouth where the dentin is soaked with juices of most varying composition. Mr. Goadby himself observed that a non-liquefier of gelatin became a liquefier on addition of potato-water to the gelatin. Suspending slices of decalcified dentin in the culture-medium brings the conditions somewhat nearer to those in the mouth.

It furthermore lies quite within the range of probability that a number of different kinds of bacteria together may accomplish results as to the decalcification or digestion of the dentin which the individual species alone could not bring about, and a thorough understanding of all that takes place in decay of the teeth will require experiments with mixed cultures, since in operating with pure cultures we have an extremely artificial condition never found in the human mouth. Also, as the production of acid takes place largely in the food found in the cavity of decay or between the teeth,—in other words, outside of the dentin,—investigation should not be restricted to those bacteria alone which are found within the dentin.

In respect to the solution of the decalcified dentin, Mr. Goadby says, "Liquefaction foci are figured by Miller having various forms, but no direct experiments were made to produce artificial liquefaction." Perhaps the fact that my publications were so numerous during former years may account also for this oversight. In the *Independent Practitioner,* 1886, p. 534, I state that the comma bacillus which I isolated from the mouth *in pure culture* liquefies boiled white of egg, as well as decalcified dentin. Again (*Independent Practitioner,* 1885, p. 286), cultures of some of the fungi were made on dentin and enamel. Sections of dentin, when decalcified, neutralized, and soaked in saliva and sugar, formed a medium on which considerable development took place, microscopic sections of the dentin after two weeks showing a *destruction of substance at the point of inoculation.* Here also I was dealing with pure cultures. The solution of saliva and sugar was of course sterilized. Also (*Independent Practitioner,* 1885, p. 172), if we add a piece of decalcified dentin to a culture of caries fungi it will be dissolved, and (*Independent Practitioner,* 1884, p. 114) pieces of dentin in a solution kept constantly pure and sour by fermentation not only become softened, etc., but finally, after some months, disappear altogether. Here reference is had to a mixture of saliva and foodstuffs.

It will be seen from these quotations that I have recorded experiments and observations regarding the dissolving action of pure cultures of bacteria on decalcified dentin in at least three different places, besides which I have repeatedly referred to the matter in my writings. It does not follow from this, however, that further experiments are not desirable, or even necessary, to clear up this point. As for the pigment bacteria, it is very doubtful, for the many reasons I have repeatedly given ("Micro-Organisms of the Human Mouth," pp. 90 and 162), whether their presence is essential to the production of the discoloration often associated with caries. Most certainly the pigmentation does not take place *pari passu* with the decalcification and liquefaction, as stated by Mr. Goadby. On the contrary, just the opposite is the case. It is well known that *caries acutissima* and white decay are synonymous terms, and that deep discoloration is found only in slow or chronic caries and in cases where the decay has ceased altogether. I do not look upon pigmentation as a stage of caries, or as a process by which the progress of the caries is in any way influenced.

Mr. Goadby warns against the supposition "advanced by some" that all organisms are capable of acid production under certain favorable conditions. This matter was not overlooked by me, and in the *Independent Practitioner,* 1885, p. 284, I state that four out of twenty-two bacteria which I examined with reference to this point produced an alkaline reaction in a solution of beef extract, peptone, and sugar, while two appeared to leave the solution neutral. The cultures which I tested were *not impure.* For these organisms I suggested ("Micro-Organisms of the Human Mouth," p. 19) the term "obligatory saprogenic bacteria." In the *Independent Practitioner,* 1885, pp. 287, 288, I wrote, "We undoubtedly have two distinct processes going on: First, the nutrition of the organism, accompanied by the appearance of alkaline products, and, secondly, its fermentative action, accompanied by acid products. Ordinarily the latter so outweigh the former that the resultant reaction will be acid. This is, however, by no means necessarily the case." (This appears to be exactly the position taken by Mr. Goadby fourteen years later.) It remains, however, a matter of fact that by far the great majority of bacteria *do* produce an acid reaction under favorable conditions.

Mr. Goadby's results as to the frequency of Micrococcus nexifer (Streptococcus brevis) quite agree with mine. Mr. Goadby states that the majority of mouth bacteria are pleomorphous. I will not dispute this, although the observations made by me in former years did not lead me to this conclusion. It may, however, be of interest to note that the second organism I obtained in pure culture from carious dentin was pleomorphous (see figure reproduced on page 855). With this I first succeeded in producing artificial caries, as described in the *Independent Practitioner* for March, 1884.

Nothing is further from my thoughts than to consider the "pioneer work" that I did as free from error. If I were to go over it now I should change many things and cancel some altogether, although the mistakes of my first communications were mostly corrected in later ones. For this very reason, however, I prefer not to have mistakes interpolated where there are none, and not to have the results which I obtained too severely slighted or "slurred over," as it was expressed by Mr. Bennett in the discussion following the reading of Mr. Goadby's paper. Nor do I wish to produce the impression that I do not appreciate the work done by Mr. Goadby. On the contrary, from its nature I conclude that our knowledge of dental pathological processes is still to be greatly enhanced by the experiments which are being carried on by him. He ought not to forget, however, that the task which the dental investigator has before him to-day in dealing with the problem of dental caries is a far easier and simpler one than the pioneers had to deal with.

In looking over other recent communications and discussions on the question of dental caries, I repeatedly meet with statements in which, owing to overenthusiasm for the work being done at present, that done long ago appears to have been entirely forgotten. For example, Dr. Fort (DENTAL COSMOS, 1899, p. 735) writes, "Dr. Miller proved twelve years ago or more that the dissolution of the teeth was brought about by acid-forming organisms, but he did not prove that the bacteria were responsible for the inception of the process." This statement does not appear to me to be quite logical. How can one be said to have accounted for a process when his account does not give a satisfactory explanation of the way in which that process is inaugurated? But, apart from this, if Dr. Fort will consult my book, "Micro-Organisms of the Human Mouth," he will find that my account of the process of dental caries begins with the enamel cuticle. I distinctly called attention to the fact that the enamel cuticle in early stages of caries forms a matrix for innumerable numbers of bacteria, and that the thickening of the enamel cuticle is due to growths of bacteria in this matrix. "In the last stages of decay—*i.e.*, of the enamel cuticle—we see only a mass of bacteria (cocci, rods, and threads), which is held together by the remnant of the membrane. The membrane in this condition affords a matrix for bacteria, as well as for very minute particles of food, and thereby accelerates the progress of decay." This growth of bacteria in the enamel cuticle may possibly coincide with the film of Williams, although such films are not restricted to the surface of the enamel (see "Micro-Organisms of the Human Mouth," Fig. 79, p. 182). Williams, Black, and others incline to the view that this film is necessary to the origin of caries, a point on which I am not yet quite convinced, as my observations would lead me to think that wherever food finds a permanent lodging-place between the teeth to undergo acid fermentation, there decalcification is bound to take place in course of time, whether there be a film present or not.

Again, it has been said that while Miller furnished an explanation plausible enough for decay of dentin, yet he left us in the dark as to the nature of decay of the enamel. But a little examination will show that the short account I gave of decay of the enamel has been substantiated by Williams in his more recent investigations. For example, in my book (pp. 169, 170) I say, "In sections (of carious enamel) the margin appears indented, and the enamel prisms more or less dislocated. The whole looks as if the *interprismatic substance were dissolved,—i.e., the connection between* *the prisms destroyed.*" This is exactly the idea brought out by Williams, and emphasized by Kirk (DENTAL COSMOS, 1897, p. 413), where they state that "the lines of least resistance through the enamel-structure are marked out by the territory occupied by the *interprismatic cement.*

Again I say (*l. c.*), "About the same result is obtained when normal enamel is treated with diluted acids," which the investigations of Williams also confirm. He writes (*l. c.* p. 358), "If we expose a section of enamel for a short time to lactic acid we shall see that the effect is substantially the same as is shown in the mouth."

In the DENTAL COSMOS for April, 1899, p. 326, Williams announces his conviction, which is perfectly well founded, that bacteria which give an acid reaction when grown in certain media may give an alkaline reaction when grown in other media. I cannot conceive why this announcement should have caused so much surprise to some members of the profession, since the fact has been before them for at least fifteen years, and was not presented by Dr. Williams as a new discovery. The subject was brought up by me in the *Independent Practitioner,* 1885, p. 285; also in the same journal for 1886, p. 115; also in "Micro-Organisms of the Human Mouth," pp. 18, 19, 105, 205, 220, etc. For example ("Micro-Organisms of the Human Mouth, p. 18), "Many years ago I called attention to the fact that the course of fermentation depends frequently more upon the sub-stratum than upon the micro-organism. Bacteria which grow upon white of egg, producing an intensely offensive smell and strong alkaline reaction, when brought into carbohydrates exhibit entirely different phenomena,—viz, acid reaction and total absence of bad smell." Dr. Fort says I "hinted" at this fact—a rather broad hint it seems to me.

This fact is one of the fundamental ideas in all my discussions on caries of the teeth, and by it I have attempted to account for the comparative immunity from caries of meat-eating races (Eskimos, etc.); also for the fact that caries does not occur in canals containing putrid pulps. I have also explained on this ground the fact that persons of uncleanly habits may have very foul mouths and still little caries when they live chiefly on animal food, and when through accumulations of tartar, etc., the gums are kept in an irritated condition and their secretions and exudations, being albuminous, undergo alkaline fermentation.

A great deal has been said, by Hopkins in particular, about the necessity of conforming to Koch's laws, but where we have to do with the question of the possibility of producing caries artificially, then the law of common sense takes precedence. This law tells us plainly that we must imitate as nearly as possible the conditions present in the mouth itself, which I did in my first attempts to produce artificial caries. It is altogether a different question when we ask whether it is possible for any *one kind* of bacterium alone to produce the phenomena of caries. Here, of course, we must have a pure culture. We do not need any law to tell us this,—*ça va sans dire.*

CATAPHORESIS AND DEHYDRATION FOR OBTUNDING SENSITIVE DENTIN.

BY HENRY W. GILLETT, D.M.D., NEWPORT, R. I.

(Read before the New York Odontological Society, April 17, 1900.)

I SHALL omit all apology for dealing with a hackneyed subject, since the real subject underlying my title is the management of sensitive dentin, which must continue a live problem till we have mastered it.

I shall assume familiarity on your part with the general subjects of cataphoresis and dehydration of dentin with a warmed current of air, and consequently shall not review the previous history of either method of procedure.

As regards cataphoresis, I desire to call your attention to a better source of current supply than has heretofore been used, and for dehydration, to a more convenient means of warming the air current than any other that I know of.

Preceding this, I desire to report the results of continued use of cataphoresis as a regular office procedure since the inception of the present method of practice,—an experience beginning in the winter of 1895,—and to point out in what way the results obtained in my hands refute what seem to me the unwarrantable charges brought against the process by some recent writers upon the subject.

I infer from the frequency with which I am asked, by users as well as non-users, if I continue to use cataphoresis, that these charges have caused some apprehension in their minds as to the possibility of unfortunate after-results. Without attempting to quote any particular statement, I will say that the charges against the process which have just been referred to, and to which I desire to devote some particular attention, may be summed up in the claim that the use of cataphoresis for desensitizing dentin results, in a formidable proportion of cases, in the subsequent death of the tooth-pulp as a direct effect of changes caused either by the drugs or the current used.

In May, 1897, it was my privilege to address the New York State Dental Society, and I desire to quote a few lines from my remarks at that time:

"As to the danger of injuring the dental pulp and other tissues, it is axiomatic that any powerful drug or application is capable of doing injury if unwisely used. If a pulp is covered by only a thin layer of dentin and a prolonged application of current is made, if, as the pulp becomes fully anesthetized and able to bear it, the current strength is increased unduly, it seems probable that injury will follow. If in bleaching a tooth by this process a leak is left, so that the current and drug can pass through the gum, it will of course be affected injuriously. I cannot conceive, however, that an intelligent use of the process can lead to ill results. There certainly seems none to be anticipated in dentin or in the pulp. I have as yet seen no instance in which I could trace an undesirable sequence to the effect of the current or the cocain. One case was recently reported in which the patient, a member of this society, I think, felt that the pulp had been poisoned by cocain.

"One well-established case of this sort would demand our most careful study, but in view of the hundreds of cases where the cumulative evidence is that no such result is probable, it would seem that the evidence that the ill result was due to the cocain needs careful analysis, and that all other possibilities must be first considered."

I have quoted this because it exactly defines my position to-day after over five years of practice with cataphoresis.

I am not here to make the dogmatic assertion that no pulp has been injured by the careful use of cataphoresis, or even to express my opinion that such is the case.

I do wish, however, to call attention to the fact that general assertions to the effect that pulps are so injured have little value unless supported by exact details as to all conditions, in view of the fact that not only one, but many practitioners have used cataphoresis for some years and have been able to discover no ill results.

In the opinion of the writer, the duty lies upon those who make these charges against a process which a reasonable proportion of their *confrères* find a very desirable and useful one, to place their specific cases of ill results on record with the same care as has been shown in recording favorable results. Until they shall do so, it would seem that they are open to the charge of blocking the wheels of progress without good cause, and failing to do their whole duty to their profession and its clientele. I have strong suspicions that these general charges of ill results come from the ranks of those who have used apparatus which they did not understand, and often with no means of measuring the quantity of current used, and in still larger proportions from the ranks of those who leave in the bottom of cavities layers of decayed dentin, which may probably have reached or nearly reached the pulp.

I do not care to express at this time my opinion of this latter practice, as it is an important subject by itself, and should not be injected into the discussion of the problem before us to-day. But it is necessary to note that no claim that cataphoresis has injured the pulp can have any reasonable ground to stand upon if such conditions have been left in the tooth subsequent to the cataphoric application.

To claim this is merely to utilize a convenient scapegoat and allow the real criminal to go free.

I desire to repeat that in my own practice I have, as yet, seen no case in which I could trace any undesirable sequence in the tooth-pulp or tissue to cocain cataphoresis as a cause.

Let us assume for the moment, however, that there are such cases.

In that event are we justified in discarding the treatment for an occasional ill result?—and the evidence certainly warrants the position that these cases can, at most, be but small in proportion. The answer can only be harmonious with our practice as regards cocain, ether, morphin, and many other drugs and procedures which continue to be used for the good they accomplish, rather than discarded for the occasional ill they bring about.

I would urge upon those who feel that they have unintentionally destroyed pulps by this means to look sharply to the evidence, lest it incriminate their capacity rather than the process. To such I would suggest a careful perusal of an article by Dr. Price in the Dental Cosmos for May, 1898, with particular attention to pages 378 and 379.

Long-continued applications and heavy currents in cavities where there can be only a thin layer of dentin over the pulp are inadmissible, and to use apparatus without an accurate milammeter in such cases (or for any case) is a procedure to be most roundly condemned.

If injury follows such practice the operator should assume the blame,—the warning against it has been repeatedly published.

This I regard as the main point deserving attention, but there are a few others to be noted.

For those who fail to get any results from cataphoresis, little need be said,—the fact that many do get results is sufficient comment.

That the time needed for the procedure is an unfortunate fact and often forbids its use has always been admitted. This fact has probably led to its disuse by many. I see as yet no hope of remedying this difficulty, and in my own practice I find the length of application not diminishing.

This, however, is intimately related to other facts which need to be stated in connection with it.

Cataphoresis in my hands is reserved for the difficult cases,—for the cases calling for deep cutting and for patients demanding complete control of sensitiveness. A large proportion of these cases come among the approximal cavities of molars and bicuspids. Having been all my professional life a steadfast believer in the widening of these cavities in their preparation along the lines so admirably stated by Dr. Black, I have found that by the aid of cataphoresis I have been able to carry out my ideals, without unreasonable demands upon the fortitude of my patients, much more faithfully than before I had its aid. To do this means affecting a much greater area of dentin than when it is desired to merely clear away the decayed material to a point showing sound margins, and consequently a longer time for the application.

The benefit resulting to my patients from this possibility has been so great that I should feel that it more than offset the death of an occasional pulp, had it occurred.

Is cataphoresis worth while?

Does it consume so much time as to forbid its satisfactory use?

These important questions must be answered by the individual operator and his clientele, and the reply will be influenced greatly by the personal equation.

My personal experience is decidedly favorable to its use, and a considerable proportion of my patients insist upon having it used for all sensitive cavities after once experiencing its benefits. In many cases its use permits the doing of permanent and satisfactory work where only very unsatisfactory conditions would otherwise be attainable; and in other cases where the patient would be able to summon sufficient fortitude to permit of satisfactory work, the use of cataphoresis saves time as well as pain, by reason of the rapidity with which the cavity may be prepared when free from sensitiveness.

Its use has lifted a burden from me, in the handling of cases of extreme sensitiveness, which I would be very loth to assume again, and it has done so much for my patients that I should feel it a breach of trust to discard the process.

The fact that I have installed expensive apparatus for dehydration is evidence that this report is not that of an exclusive hobbyist.

For those cases that offer chance of success with simpler methods I use those methods, and depend to a large degree upon the best equipment for efficient instrumentation which I can find in the market.

A word now concerning cataphoric apparatus. In the paper previously referred to, I made the following statement: "Theoretically, the motor generator presents qualities that recommend it to the mind of the electrical engineer over most of our sources of supply. By its use the convenience of the dynamo, ready at any moment to do service, is obtained, and with none of the attendant possibilities of danger, since the street wires are entirely cut off from any connection with the patient.

"In such apparatus we have first a motor run by the street current, which in turn furnishes power to run a small dynamo of such capacity as is suited to the work to be performed. In the case we are considering, for instance, one capable of delivering a twenty-five, thirty, or fifty-volt current as a maximum; supplied with this, we are provided with absolute safety, and as near absolute reliability as is obtainable."

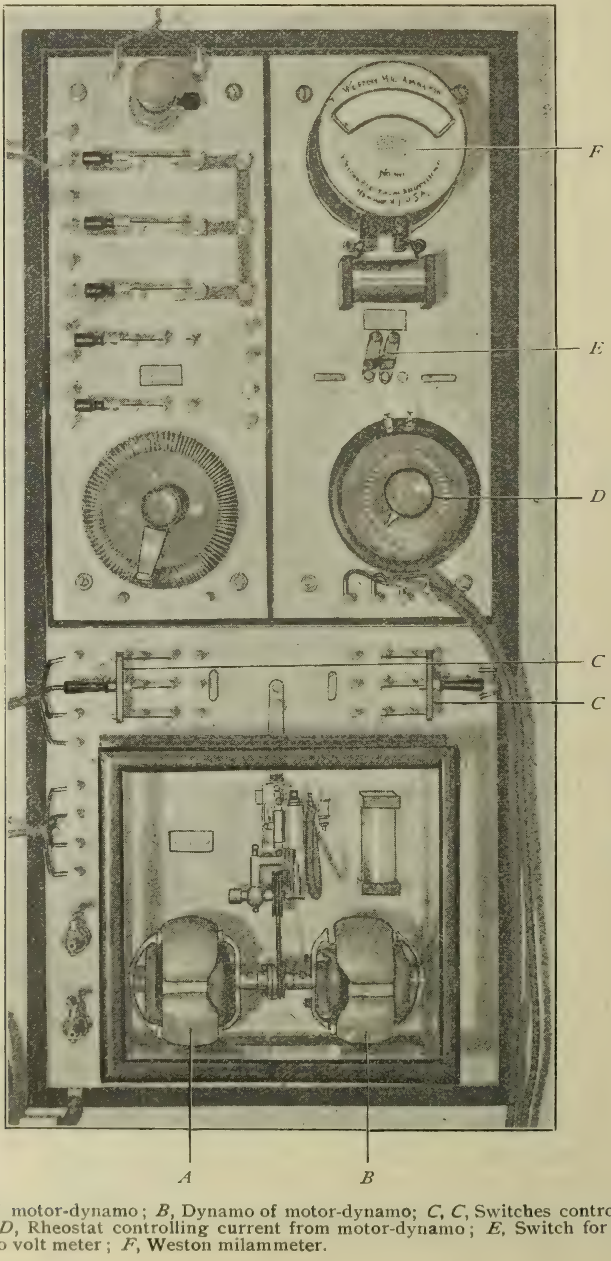
Some two years later, in the course of negotiation with the builders of this outfit before you, they independently made a similar suggestion, and at my request worked out a result which I regard as a perfect apparatus for delivering current for cataphoric purposes. It consists of two lathe motors coupled together with a shaft provided with an insulating section in the center, so the 110-volt current cannot get to the second motor in case of any grounding of current in the first motor. The two motors occupy a space readily covered by a case with the dimensions 12 x 6 x 5 inches. This particular case is 12 x 12 x 5, in order to inclose certain other apparatus which I have associated with it. (Fig. 1.)

When the 110-volt current is switched into the first motor, it serves to drive the second as a dynamo, delivering, at the maximum speed allowed by the foot controller used, a 50-volt current with proportionate reduction in voltage for less speed.

This current is led through a Weston milammeter to a rheostat which controls the voltage, and by so doing the quantity of current delivered to the patient.

There are several points in particular to which I wish to call your attention. The absolute safety of the appliance as regards dangerous currents reaching the patient, coupled with all the convenience of the street mains as a source of supply, is the most im-

Fig. 1.



A, Motor of motor-dynamo; *B*, Dynamo of motor-dynamo; *C, C*, Switches controlling motor-dynamo; *D*, Rheostat controlling current from motor-dynamo; *E*, Switch for changing milammeter to volt meter; *F*, Weston milammeter.

portant of these. The fact of its constant readiness and the absence of need for the care of batteries are of secondary importance as compared with the assured safety, but are of considerable value since a convenient appliance will be used often, where an inconvenient one is barred out by the additional time it takes to put it into commission.

The Weston milammeter with a scale of 5 millis, you will recognize at once as a standard appliance.

This one has certain special qualities to which I wish to call your attention. It is mounted in the patient's circuit and shows the quantity of current actually being used in that circuit, easily readable to 40ths of a milli, but by throwing a switch which is so nicely adjusted that it can be done without disturbing the patient, the appliance becomes a volt meter with a scale reading 50 volts and measuring accurately the voltage of the current being used at the moment.

Next to this as a convenience and as skillful concentration of apparatus, I value the arrangement by which the same foot controller or rheostat regulates the speed of the engine and the motor dynamo, it being necessary only to throw a switch to change from one to the other.

This apparatus has been in constant use for ten months, and has given me the utmost satisfaction in every particular. It is always ready, never out of order, and the current is free from annoying fluctuations. The accuracy of the meter begets confidence in the operator, and the certainty with which he can assure patients of the entire safety of the application, when coupled with these conveniences, leads me to consider it the most perfect apparatus for the purpose yet devised.

With regard to dehydration, I have but a few words to say. You are all familiar with its efficiency in a certain class of cases.

It had been my theory for years that its usefulness would be greatly increased by having appliances permitting the very gradual increase of both pressure and temperature of the air current used as the active agent for the process.

These conditions are feasible only by the use of compressed air and an electrical appliance for warming it. The compressed air outfit which I use is that made familiar to you by the work of Freeman, Van Woert, and others, so I need not enlarge upon that point.

Air may be automatically compressed also by electrically-driven compressors.

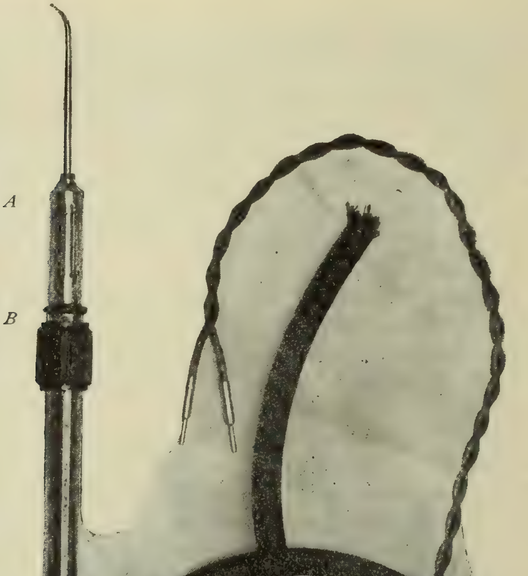
The compressor, tank, cut-off, pressure regulator, pressure gauge, and stop cocks make up the essentials of the compressor outfit.

The point of particular interest to which I wish to direct your attention is this electric warm-air syringe, which is the first successful one which I have been able to find. (Fig. 2.)

You will note that the warming of the air current is accomplished by passing the air through and around a platinum coil which is heated by the current from 3 cells of storage battery,—the current being controlled by a convenient rheostat so as to permit of quite a large range of temperature in the coil.

The air and electrical supply are controlled by independent cut-offs and also a cut-off on the syringe itself, which turns on the air before the electric current, and in turn cuts off the electricity first, thus safeguarding the platinum coil against injury.

FIG. 2.



A, Location of platinum coil for heating air; *B*, Cut-off for air and electric currents.

With this appliance I am able to start an operation with a current of air at a fraction of a pound pressure warmed to blood heat, then to increase both pressure and temperature at will. If desired, an air current at 30 or 40 pounds pressure may be kept by this appliance at a temperature agreeable to the patient and adding much to its drying power.

With some cases, notably buccal and labial cavities, where very deep cutting is not needed, this procedure will control all sensitiveness, and do it more promptly than cataphoresis.

INLAYS, THEIR ADVANTAGES AND LIMITATIONS.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

(Read before the National Dental Association, July 10, 1900.)

THE demand for inlay fillings arises chiefly from two factors which present themselves in the problem of saving the natural teeth when badly affected by caries. The first of these relates to the unsightliness of most metal fillings when exposed to view in the anterior part of the mouth, and the second to the fact that in many instances of extended caries the insertion of foil fillings proves too great a tax on the patient.

The indiscriminate exposure of gold in incisors and cuspids has justly given to American dentistry a certain reputation for vulgar display which cannot longer be ignored. If we as a profession are to rise to the highest possibilities of our art we must exercise a due regard for the esthetic effects of our work, as well as for its utilitarianism. It has truly been said that the most perfect conception of art is to conceal art, and in no department of human endeavor is this more strikingly true than in the practice of dentistry.

Unfortunately for us and for our patients, we are not yet able with our present facilities to uniformly combine esthetic effects with utility, for, much as the herald of trumpets has sounded forth throughout the land, the dental millennium is not yet upon us.

There are certain cases where, by the judicious use of inlay work, ideal results may be attained, but there are a vast number of others where the conditions are such that inlays cannot by any possible means be made artistic and permanent. In alluding to the artistic features of inlay work reference is of course made to porcelain inlays, and it is doubtless true that a properly constructed porcelain inlay is more artistic in appearance than any other kind of filling-material. But when this is said, almost all is said that may be in recommendation of this kind of work. The simple fact is that in the very cases where the greatest need is manifest to avoid conspicuous operations porcelain fails in other important requisites to a degree which renders its use almost prohibitory.

For instance, in a long, thin, translucent central or lateral incisor with an approximal cavity which involves the incisal angle we have a type of case which calls not only for harmony of color, but for some material which possesses great strength in a given bulk. It is here, if in any place, that appearance is important, and in no less a degree is it necessary to reproduce the lost angle with a substance which is capable of withstanding attrition and not suffer displacement or fracture. Porcelain, when carried out into thin edges, such as are sometimes called for in these cases, has not the requisite strength or toughness to do extended service in the majority of mouths. It will not do to point to a few isolated instances where porcelain has proved satisfactory in such cases, and argue therefrom that it is always to be depended upon. In some mouths the volume of usage on a given tooth is very small, and any kind of a filling-material will do service, but these are the exceptions.

It must be acknowledged that a perfectly condensed gold filling is infinitely tougher and less friable than porcelain, yet even the best inserted gold fillings are sometimes inadequate to the strain. Then the question of anchorage is often an important factor in these fillings. With the incisal angle gone and the necessity existing for its reproduction, a certain area of the inlay is exposed directly to the force of attrition, and the anchorage afforded by the cement cannot be considered sufficient to maintain the inlay in place for any extended use. It has been found that in the insertion of gold in these cavities, with all the nicety of adaptation possible, and with the greatest density and strength, failures have too frequently occurred through displacement of the filling from the incisal anchorage, so that observant operators are quite generally resorting to the plan of anchoring these fillings by drilling across the incisal portion of the tooth and making an anchorage at right angles with the approximal cavity. This seems the only certain method of locking these fillings securely in place, and it is a method which cannot in ordinary cases be successfully followed with porcelain. Even in those instances where a perfect alignment and perfect form can be given the inlay, the lack of strength at the point where the approximal portion joins the incisal portion is always an element of weakness. The filling-material must be especially tough at this point to prevent breakage, and, as has already been intimated, porcelain is too friable to be subjected to this kind of stress.

Another important factor in these cases is the protection of thin enamel. With gold—or better yet, with platinum and gold—a wall of enamel may be adequately protected by building the filling over it to the thickness of one-half a millimeter, while porcelain, to afford any protection whatever, must be laid on in appreciable bulk. At best, porcelain must be considered a poor protection to thin enamel-walls, even where it can be successfully built over them.

It will thus be seen that in many of these very conspicuous cases the indications are almost wholly against porcelain inlay work, so far at least as permanence of result is concerned, and in passing it may be well to call attention once more to the possibilities of platinum and gold in this particular class of cases. The shade may be so varied with this material as to take away the extreme yellow luster of gold and produce fillings which are never glaringly conspicuous, and which are immeasurably more reliable and secure than the best possible porcelain inlay. A closer study of this material on the part of the profession will accomplish much in the way of disarming the persistent criticism against display in American dentistry, a fact frequently pointed out by our good friend, Dr. H. J. McKellops.

And yet, as has been stated, there is no metal filling which can quite take the place of porcelain in appearance, and it should be our aim to study the possibilities of porcelain and adapt it to those cases where the indications are favorable to its use.

Such cases are represented by all cavities which are not exposed to attrition, but which are freely exposed to view. Those with a broad opening to the labial—particularly those occurring in the gingival third of the labial surface—may be accounted typical cavities for porcelain inlays. It is here that artistic and serviceable work may be accomplished, provided the operator attains a mastery of shades. This question of shading becomes a matter of very great importance in its relation to artistic results, and this, if there were no other reason, should determine the selection of bodies for such work which fuse at a temperature sufficiently high to assure permanence of color. The bodies which are capable of being fused on gold cannot be relied on to permanently maintain their color in the mouth, nor are they so strong in a given bulk as the higher-fusing bodies. If porcelain inlays are indicated at all, the very best and strongest and densest porcelain is none too good for the purpose. The present clamor for short-cut methods in this kind of work is calculated to lead to such imperfections as will eventually bring the work into disrepute, and throw doubt on an otherwise legitimate line of practice.

The indications for inlay work, aside from esthetic considerations,—viz, the undue tax on the patient in the insertion of large foil fillings,—apply particularly to molars and bicuspids. It is here that inlays really may be made to answer the most useful service. In cases where an appreciable portion of the crown is gone inlays of gold may often be inserted to good advantage, and thus save the patient the tedium of a protracted filling-operation. These inlays of gold may be used in very many cases where operators have been in the habit of crowning teeth. It is often a nice point to decide where fillings shall stop and crown-work begin, but if the operator has a true conception of the possibilities of gold inlays he may frequently save himself any doubt in the matter by employing this ready method of closing the gap between filling and crowning. A tooth with any appreciable portion of the crown missing has in later years quite generally been consigned to excision of the remaining portion for the purpose of inserting an artificial crown, quite irrespective of the condition of the part still standing. This is hardly living up to the highest possibilities of dentistry, because the history of crowns in the years to come will go to prove that the best interests of the patient will be conserved by deferring crown-work as long as possible. The serviceability of many a tooth may be prolonged for years by the judicious employment of inlays in those cases where there has been so great a loss of tooth-tissue as to make the insertion of a filling injudicious. The tenure of service of the inlay may be logically added to the ultimate life of the tooth. from the fact that when the inlay fails the tooth may then be crowned with as great a promise of future usefulness as if it had been crowned at the outset. In pursuance of our work upon the natural teeth we should have in mind not only the comfort of the patient at the moment, but the greatest ultimate length of service that we can secure for the organs operated on.

One very favorable feature of gold inlay work relates to the adequate protection it affords to weak walls surrounding the cavity. It is in this respect that gold inlays are vastly superior to porcelain inlays. In preparing cavities for gold inlays the frail enamel may be freely ground and extensively beveled with the assurance that the edges of the inlay when built over them will prove an all-sufficient protection against wear or fracture from impact of mastication. In fact, this is one of the cardinal requirements in preparing these cavities, that the margins of the cavity, particularly those in the occlusal region, be very freely beveled so as to admit of a perceptible overlap of the inlay. A degree of bevel may safely be given the enamel for these inlays which, if employed for foil fillings, would prove an element of weakness to the margins.

Another feature connected with these extensive bevels would seem worth mentioning,—viz, the fact that the cementing substance used for holding the inlay in place appears to be in a measure protected by the overlying margin of the inlay. If these cases are carefully examined some time after their insertion it will ordinarily be found that the cement is dissolved out for a short distance under the extreme margin of the inlay, but that the dissolving out seems to stop at this point and not penetrate far enough to jeopardize the inlay. This has been noted so frequently that it has proved a matter of considerable encouragement, so far as the permanency of cement is concerned under gold inlays with extensive bevels.

It was formerly the impression of the essayist that the cementing material was invariably an element of weakness in the use of inlays, but a more extended observation would seem to indicate that we have little to fear from this, particularly with these gold inlays and a high-grade quality of cement. It is with inlays, as with every other line of our work, that the real test, after all, is the test of extended practical experience, and no amount of preconceived opinion can have weight against this kind of evidence. So many of these gold inlays have been examined after years of service, nearly all of them presenting this peculiarity, that it would seem impossible to doubt that where due care has been exercised in the adaptation of the inlay and a good grade of cement used little fear need be had as to any serious washing out of the cement.

But as to the relative merits of fillings and inlays in general, it may be stated that in the vast majority of cavities presented for our treatment fillings are infinitely more serviceable than inlays. The requisites for inlay work are in many respects so arbitrary as to prevent the possibility of its being at all universally applicable. A cavity must be cut in such a way that the orifice is more widely extended than the interior, and in many instances this involves the breaking down of strong walls which with ordinary filling-operations might be allowed to remain. For instance, in an approximo-occlusal cavity in a bicuspid where the decay has extended well around to the buccal and lingual surface at the gum-margin, but where the walls of the cavity are strong and well supported near the occlusal region, it would be a very radical procedure to cut away the buccal and lingual walls parallel with the decay in the gingival region, as would be necessary to properly fit an inlay. It would not only be a tax on the patient, but would materially weaken the tooth. This is only one of the many cases where a perfectly fitted inlay would involve too serious a sacrifice of strong walls, and this may be said to apply as well to incisors as to bicuspids and molars.

There are numerous cavities which may be made to receive a foil filling without any exposure to view, but which if sufficiently opened out to receive an inlay would thereby be rendered conspicuous. In fact, in the majority of cavities which apply to us for treatment the insertion of an inlay involves the extension of the cavity outlines to a degree unnecessary in an ordinary filling; and while this extension is often a safeguard against a recurrence of decay in bringing the line between inlay and enamel to a point where it is readily kept clean, it sometimes leads to unnecessary exposure of the operation. No method of reproducing lost enamel can ever quite equal in appearance the natural tooth-structure, and the less conspicuous our operations are made the nearer we are likely to approach artistic perfection in our work.

One other factor in connection with inlay work relates to the greater expenditure of time necessary where inlays are used than when ordinary fillings are inserted. It is true that the element of time is a minor matter when considering the accomplishment of the highest class of service to our patients, and yet in the daily routine of office practice time becomes important. With a cavity of average size it is conservative to state that a gold filling may be inserted in one-half the time required for an inlay, and the resultant operation will at least prove equally permanent, so that this feature of the case cannot well be ignored.

It may therefore be said in conclusion that the legitimate use of inlays is quite narrowly restricted to those exposed surfaces where artistic effects are very important, and to the cases where the tooth-tissue is so extensively broken down as to make the insertion of a foil filling too great a tax on the patient. To employ inlays outside of these indications is either to misconstrue their true function, or to let enthusiasm overbalance judgment.

AN IDEA IN SHELL CROWNS.

BY JAS. KENDALL BURGESS, D.D.S., BALTIMORE, MD.

(Read before the Union Meeting at Richmond, Va., May 10, 1900.)

SHELL crowns are too well established to admit of any discussion, except as to methods of construction and adaptation; so without further preamble I will come at once to my subject.

The crown which I am about to present is called the "ledge crown," and is so named from the inside ledge or rim, which is its distinguishing feature and the chief object of my paper. In order to show more clearly its advantages and the manner of constructing it, I have thought best to present briefly, by means of the accompanying specimens, the several stages in my method of making a shell crown.

Fig. 1 shows the plain strip of gold, of whatever grade and thickness preferred, cut to measure.

Fig. 2 is the soldered band which is now tried upon the tooth, and with shears and pliers the relations all established; that is, with reference to the irregularity of the gum, the occluding teeth, the length and circumference of the tooth being crowned, the alignment and the adjacent teeth, all this being shown in Fig. 3.

Fig. 4 shows the next step, which consists in soldering a plain, flat piece of 24 k. gold, 33 to 36 gauge (preferably the latter), across the occlusal end of the band. The surplus is now trimmed flush with the outside of the band and with a sharp blade of a pocket knife the central portion cut out, much after the fashion of opening a can, leaving a ledge about one-thirty-second of an inch wide extending all around from the circumference toward the center, as seen in Fig. 5. This whole operation of soldering and trimming may almost be done in the time it takes to tell it. The band should now be placed upon the tooth to see that none of the relations have been altered. The occlusal surface, swaged of 24 k. gold, 35 or 36 gauge, from Melotte's, Hollingsworth's, Lowry's, or other dies, or specially carved cusp, if you choose, as shown in Fig. 6, is now soldered to the band in the ordinary way, just as if the extra ledge were not there. A definite relation is thus established between the band and occlusal surface, with no risk whatever of altering in subsequent soldering, as is the case where the cusps are first filled with solder, placed on the tooth and marked, then cusp and band removed and soldered. We have now what we term a "skeleton crown," shown in Fig. 7. This is now placed in position upon the tooth by lightly shaking and pressing with the thumb and finger on the sides of the band, taking care not to press on the soft grinding-surface, and patient allowed to close firmly, when, if the work has been properly done, a perfect occlusion is easily

FIG. 1.

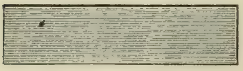


FIG. 2.

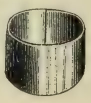


FIG. 3.

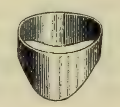


FIG. 4.

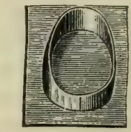


FIG. 5.

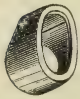


FIG. 6.

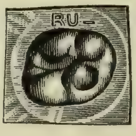


FIG. 7.

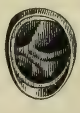
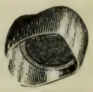


FIG. 8.



obtained; being virtually swaged at every point where the occluding teeth come in contact with the soft, pure gold, overcoming the annoyance and difficulty of grinding the occlusion in a cusp previously filled with solder.

Now, upon looking inside the crown we see the use of the ledge, which is the real object of this paper. Here above the ledge is the space allotted the tooth, and between the ledge and inside of occlusal surface that for the solder, and the one cannot intrude upon nor interfere with the other; for by placing the solder in proper-sized pieces, so as not to overlap the ledge, the cusp may be filled flush with the ledge in a jiffy, obtaining the conditions found in Fig. 8,—a crown with a solid heavy grinding-surface and perfectly flat bottom, with no solder climbing up the sides to interfere with the tooth, spoiling a carefully obtained occlusion and necessitating a refitting with all of its disagreeable features to both patient and operator. The crown may now be contoured with solder, or this may have been done with pliers previous to soldering on the ledge, if the operator prefers that method, and is ready for finishing by any desired method.

Perhaps I ought to call attention to a number of more or less important points that every operator would sooner or later find out for himself.

I make my "skeleton" complete with a high-flowing solder, and contour and fill the cusps with a lower-flowing one, say 20 k. and 18 k., respectively. If occlusal ends of bands be made irregular in shape to suit such a bite, or if it be clipped all around or part way to reduce circumference, none of these things interfere in any way whatever with use of the ledge.

The occlusal surface should first be tacked to the band on the lingual side and placed on the tooth, when the buccal side may be raised or lowered as occasion requires to correspond with adjacent teeth, and the bite tested, then removed and soldered permanently, before the bite is finally taken.

Before this last step, however, it should be seen that none of the little ridges inside of the grinding-surface stand above the level of the ledge and so interfere with placing proper amount of solder. No special care need be observed in the use of borax inside of crown when filling the cusps, the only precaution necessary in this regard being to use plenty of it and to place solder so that it shall not overlap ledge, thus flowing on top of it instead of underneath. All these little precautions take but a moment's time and make more artistic and substantial work, with no after-trouble.

Thus we claim for the "ledge crown" ease and accuracy of construction, combining as it does all the advantages and eliminating the objectionable features of the other methods, both in the manipulation and in the finished work, with an actual saving of time, almost no extra expense of material (all my clippings being melted in my own laboratory, rolled and used over and over again), and with all the pleasure and satisfaction that comes with exchanging an uncertainty for a certainty,—mere guesswork for something definite, positive, accurate.

ORTHODONTIA.

BY DR. THOMAS B. MERCER, MINNEAPOLIS, MINN.

The epithet "Philistine" is unpleasant; at least to those who prefer to look upon people and things in a macroscopic, rather than a microscopic, manner. But when an illustrated article appears in a journal purporting to instruct that apparently does not instruct, but misleads, then a few words of protest seem entirely warranted.

Orthodontia, from the very nature of the work, extends invitation to the theorist, but the application of his theories to actual practice is often, as most of us know, all but a huge joke. The theorist, in his periodical bursts of originality, appears at times to wholly forget the axiomatic principles in the construction of appliances,—namely, simplicity, efficiency, and delicacy.

The *Dental Review* for March contains an article entitled "Rotating Teeth—Principles and Appliances," from which the following is quoted: "To understand these principles we should be familiar with the simple laws of motion and the principle of levers; also the result of applied energy and the kind of apparatus that will serve our purpose to the best advantage."

No one could safely presume to doubt this statement, but it seems rather inconsistent with much that follows.

In Fig. 1 his purpose is to rotate an upper central incisor, but this is plainly impossible without creating space. If we are to assume that space was created, this at once involves the lower arch, of which no mention is made. In rotation by this method the object of the alignment arch (outside of as an attachment for the lever) is not quite clear. Why not band the left upper second bicuspid, attaching spurs mesio- and disto-lingually, so as to involve the first bicuspid and first molar; then affix the buccal attachment for the lever and do away with the arch entirely? On the other hand, if it is wished to create space and rotate at the same time, the alignment or expansion arch offers a most simple and effective method; but a very differently constructed arch from that shown in the illustration would be used. It would be threaded at both ends, and the nuts made to engage the pipes mesio-buccally, in order to resist a backward rather than a forward tendency. Space is made by encircling the necessary teeth with wire ligature, and attaching them tightly to the arch. These wires are tightened from time to time, as are also the nuts. Rotation is accomplished by attaching a wire ligature to a spur on the lingual surface of an accurately-fitting plain band cemented to the tooth, and drawing it tightly forward (or backward, as the case may be) of a lug on the expansion arch. As the arch moves forward and creates space, the tooth is rotated as well. If, however, after sufficient space is gained, one *insists* upon rotating by the lever, it can be readily employed, but there seems little occasion for such action.

In Fig. 3 his design is to rotate a first bicuspid. Without rearranging his appliances, however, his prospects of success appear most unpromising.

A bicuspid is, roughly, about one-third wider bucco-lingually than mesio-distally. The jack- and traction-screws, it has been noticed, follow the curve of the tooth. Certainly, then, before the operation is half complete, the greater bucco-lingual width will tend to spring both screws and impinge them against the edge of the pipes. At this point further stress upon the nuts would strip the thread. If the spurs had run out at right angles sufficient distance to engage straight jack- and traction-screws, any accumulated skepticism in regard to the laws of mechanics would vanish at once.

The appliance shown in Figs. 4, 5, and 6 one hesitates to take seriously. It is plainly manifest that space must be created, no matter what method be employed. This space must also be preserved during the process of rotation. The expansion arch hereinbefore described suggests means by which space may be created, preserved, and the tooth rotated all in one continuous operation. Why, then, should space be made with one appliance and rotation accomplished with another, especially one that lacks the virtue of simplicity, to say the least?

Reference has been previously made to the absolute necessity for treatment of the lower arch in such a manner as to establish correct occlusion. To those who have broken away from the too long unquestioned dogmas and unstable theories so long current, and have once known the joys of occlusion in this direction, no argument is necessary. With them it has become the very basic principle for every move.

No one of us has failed to be impressed with the marvelous cunning of nature in the arrangement of the cusps, both for the reduction of food and the maintenance of their harmonious relations one to the other; nor have we neglected to note the dogged persistency with which the tongue, lips, and cheeks and occlusal planes work together to retain the teeth in their respective positions, whether it be in normal or in malocclusion. With this for a cue, then, it seems almost self-evident that we cannot have one force acting independently of the corresponding resistance of another without ultimate inharmony.

Suppose, for instance, this same upper central incisor is to be rotated; space is created (if it be of Class I, Angle) by carrying outward all teeth lingual to the line of normal occlusion. When rotation has been accomplished, if the teeth in the lower arch are not brought out correspondingly there will be represented one force (the lip) acting without the resistance of the other two (occlusal planes and tongue), and disaster is the inevitable result.

From the last paragraph of the article the following is a quotation: "If we would correct irregularities in teeth, it is important that we be able to construct the necessary appliances in order that we may more fully understand how to use them. No man can successfully regulate teeth if he has to depend on some one else for his appliances."

It would appear a foregone conclusion that any one practicing orthodontia successfully would have the ability to construct his own appliances, from the fact that orthodontia demands positive results, and the spirit that gains positive results in this science is not of the slipshod, half-hearted, compromising kind. If it be granted that he has the ability to construct appliances, does it necessarily follow that he must continue making them indefinitely "in order to more fully understand how to use them"?

There are seven possible positions in which a tooth may be said to be in malocclusion, and any possible tooth-movement may be accomplished with one of a less number of appliances.

Experience seems to clearly indicate that a molar tooth, from its unfavorable shape, precludes the use of a soldered band. Stationary anchorage is imperative, and a soldered band cannot be adapted closely enough to insure this condition. It is no grave or complex matter to make a traction or clamp band, but after it is made it is an approximate or exact counterpart of those on the market, and must be burnished and adapted to the tooth in the same manner. With modifications to suit the case, the same may be said of a traction screw or an expansion arch.

There are, of course, some appliances that we will always have to make. The issue must resolve itself ultimately into a question of time if he does it himself, and economy if he employs an assistant to do it.

In conclusion, I am going to express a positive wish and a fading hope. My wish is that my words may be received in the spirit of honest intent. My hope is that my argument may have as strong a convincing power as it has sincerity of purpose.

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CORRESPONDENCE.

TECHNICAL TRAINING IN PUBLIC SCHOOLS.

To the Editor of the Dental Cosmos:

Sir,—In leisurely looking over some of the society discussions I found that Dr. C. S. Butler, of Buffalo, N. Y., in referring to my paper read before the International Dental Congress, August, 1899, had misunderstood one of its essential points.

In closing the discussion which followed the reading of his paper on "The Dental Educational Problem," before the First District Dental Society of the State of New York, he says (Dental Cosmos, page 365, April, 1900), "Dr. Hofheinz, in the paper quoted from, suggested the advisability of the public school system organizing departments in technique for students who might desire to study dentistry. I do not understand that it is either the purpose or the function of the state to specially educate students for any particular profession, nor have we any right to expect it. It seems to me that this question of technique education must be undertaken by the dental schools."

Neither do I understand "that it is the function of the state to educate students for any particular profession." I have at no time advocated anything of the kind. My suggestion was very much broader, and entirely misunderstood by Dr. Butler. I advocated the introduction of technical training into our secondary schools, not for the purpose of making dental students, but as a matter of additional education. The arguments for this addition to the curriculum of the secondary schools I have plainly stated, and therefore do not care to again discuss the details here.

That the future dental student would receive the greatest benefit has possibly caused Dr. Butler to look at the question in the narrow light his remarks indicate, and thus brought about his misunderstanding. Very truly yours,

R. H. HOFHEINZ,
Rochester, N. Y.

CARLSBAD, July 22, 1900.

PROCEEDINGS OF SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, April 17, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city. The president, Dr. W. W. Walker, occupied the chair.

REPORT OF THE CLINIC COMMITTEE.

Dr. L. C. LEROY. Clinics were given this afternoon by Dr. Gillett and Dr. Rhein. Dr. Gillett is present with his outfit for cataphorizing sensitive dentin, and also for dehydrating sensitive dentin by the use of compressed air electrically heated. There were two patients presented. For the one on whom the hot air was applied the clinic was an entire success; in the other case the cataphoric principle was only partially successful.

Dr. Rhein showed the use of the pneumophore in the treatment of pyorrhea alveolaris. He will explain it to you personally. He also presented something that was unusual, the substitution of a porcelain root in place of a diseased root of a molar. It was a beautiful operation, and entirely successful, the parts surrounding the porcelain root being absolutely healthy.

Dr. M. L. RHEIN. As the members of this society know, for some years past I have addressed them at different times in regard to the pathology and etiology of the condition known as pyorrhea alveolaris. During the past seventeen years, in which I have been closely studying this subject, I have in public given very little attention to the ordinary routine forms of treatment, because they are simple and are fairly well understood. But whenever, by means of some scientific work, I have been able to demonstrate some unusual method of saving certain classes of teeth that have been unusually difficult to save, I have promptly given publicity to the technique of such work, so that it would at once be at the command of every one. I have never made the statement that has so often been credited to me, that all teeth afflicted by this trouble can be saved, but I do say a large proportion of those extracted on account of pyorrhea could have been preserved. In 1888 I gave to the profession the operation of permanent fixation of very loose teeth, and its value in treatment under certain conditions. I believe that when any new treatment is practically demonstrated to have a distinct value, the sooner it is given to the profession the more creditable it is to the person interested, and the more benefit will be derived by the profession at large.

The two artificial roots I exhibited in the mouths of two patients at the clinic this afternoon may be described as "heteroplasty following the amputation of the natural roots." The name "heteroplasty" is the one commonly used by the general surgeon, and signifies the substitution of some foreign substance for some removed portion of the human body,—for example, the placing of an artificial bridge in the nose. I had intended to defer making this operation public for some time, but changed my mind for fear that if I waited too long I would find some one patenting the operation at Washington, thus adding one more patent to the already numerous list. In order to prevent the occurrence of such an incident I deemed it wise to make a preliminary exhibit of the two cases at the clinic this afternoon, although the first root has been in place only six months.

The operation of amputating a root of multi-rooted teeth is not new. It is spoken of very favorably in the "American System of Dentistry," and, while it may not be universally known, I am sure it is a very old operation to most of the members of the Odontological Society. Its value is well known in those teeth where all the alveolus around one particular root has become absorbed, and where the root remaining without any bony covering is nothing more nor less than a foreign body. In such cases it becomes a menace not only to the remaining good roots, but also to the surrounding teeth, and is very injurious to the health of the patient, as any one may imagine who saw me to-day squeeze pus out of the palatal socket of the corresponding molar on the opposite side to which the heteroplasty was performed. For almost every gentleman who looked at that mouth I was able to squeeze some pus from the socket of the unoperated tooth, showing the necessity of removing the palatal root from this molar. That the gum around the artificial palatal root on the opposite side was in a healthy condition was made evident by the inability on pressure to produce the slightest degree of any exudate. By means of these crude drawings I will endeavor to illustrate the technique pursued in these operations.

(Illustrating.) Fig. 1 represents the method followed on an upper molar, as in the cases shown this afternoon. A about indicates how the molars of both of these cases presented themselves before the operation was performed, showing about half the palatal root to be exposed. The pulp was first removed, and the roots filled. In the tooth in the young woman's mouth the pulp was alive when she first presented herself, although there was absolutely no attachment to any portion of the palatal root. With an ordinary fissure drill it takes but a very few minutes to sever the root from the crown at the point indicated in B. You will find the roots in this little box which I pass around, and also duplicates of the porcelain roots which replace them.

The porcelain root as shown in C is made in the following way: The amputated root is covered by fine paraffin, in order to make its surface thoroughly smooth. An impression in plaster of Paris of the root is then taken in two halves, as, in order to obtain the best results, it is necessary that the porcelain substitute should be baked in two separate parts. With these impressions we now proceed in the same manner as in making an ordinary porcelain inlay. We now have two platinum matrices, each one representing a portion of the shape of the desired root. The sides of each matrix are first stiffened by baking a little porcelain on it; more is then added, and before the body is flush with the top of the matrix the platino-iridium pin which is to enter the crown is placed in proper position in one of the matrices. After the two parts are completed, the sides which are to come together are ground so they will fit accurately in the same manner that we would grind a porcelain tooth in order to obtain a proper joint. The platinum is then stripped from the half without the pin, and the surplus platinum from the remaining matrix is then burnished around this half in order to keep the two parts in perfect juxtaposition. The sides, having been previously painted with a thin film of body, are then placed in the furnace and fused together. The platinum is now stripped, and any little sharp edges around the joint are removed by grinding, and the entire surface painted with a very thin film of body. It is returned to the furnace for the last time, and the heat turned off just prior to the stage of glazing. This leaves the artificial root a very good reproduction of the amputated model, as shown in C. We enlarge the cavity in the crown of the tooth. D, so as to include the palatal sulcus, which would be found necessary in order to permit the pin to enter the crown. The porcelain root is then placed under the gum where the old natural root rested, and the pin drawn up in position against the crown of the tooth. Care being taken to have the part thoroughly dry, Fellowship alloy, mixed soft, in sufficient quantity is then forced into the crown of the tooth and in the interstices around the root, making a joint such as was seen in the young woman's mouth this afternoon. The finished operation is shown in E.

FIG. 1.

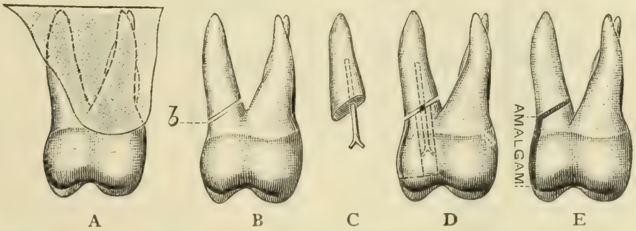
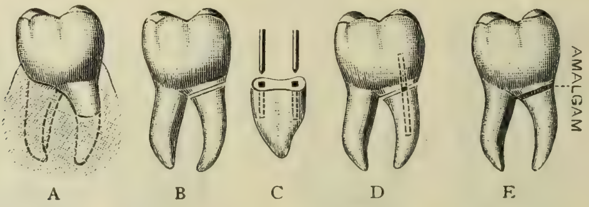


Fig. 2 exhibits the operation of replacing the amputated anterior roots of a lower molar. A is a fair illustration of the root prior to amputation, showing the gum-line and the amount of the exposed portion of the anterior root, the dotted line showing the amount of root supposed to still remain underneath the gum. I had this case under treatment three years, trying in vain to get it in a healthy condition. Although the deposits were frequently removed, yet as I pass around the amputated root the very extensive deposits all over the end of the root are manifest. This was the only tooth in this patient's mouth that was apparently involved by any form of this lesion. Some months ago the pulp, although living, was removed, but no benefit to the anterior root resulted, as it was already nothing but a foreign body; and a constant exudation of pus remained which could not be relieved in any manner. The root was amputated at the point shown in B, but the technique of the heteroplasty was somewhat changed. Instead of baking the platinum pin in the root, there were baked in the root two platinum boxes corresponding to the position of the two root-canals. Two platino-iridium pins were made to fit these boxes; the root and pins are shown in C. The advantage of this method consists in there being no necessity of removing any portion of the sides of the tooth, and thus preserving a much stronger natural crown. The artificial root being now placed in position, and everything being thoroughly dry, the boxes are filled with cement. D shows the pins being forced into the soft cement in the boxes. The crown cavity is now filled with Fellowship alloy, sufficient of which is forced between the artificial root and the stump of the crown in order to make a proper joint. The completed operation is shown in E.

FIG. 2.



We claim for this operation that we replace a disorganizing organic material by an absolutely aseptic inorganic material, that cannot be acted upon by the fluids of the mouth. Five months of observation have evinced the fact that the health of the gums around these roots becomes constantly better. The gum, in its efforts to shrink, contracts tightly against the porcelain root, holding it firmly in position, and thus preventing the entrance of any extraneous matter. In every case the flow of pus has immediately ceased after the insertion of a porcelain root.

The other clinic given this afternoon was a demonstration of the pneumophore, manufactured by the Wappler Controller Company. The machine as shown here consists of a motor which operates a pump producing different forms of pneumatic action. The apparatus, which they made originally for Dr. Houghton, an ear specialist, for the purpose of giving pneu-massage to the tympanum mainly, is in use to-day by many ear specialists. Believing that this action would be valuable in increasing the nutritional condition of the gums and the tone of the alveolus generally in certain forms of pyorrhea and erosion, I have given it a trial for some months. The results have been so pleasing and argue so well for the future that I take great pleasure in placing the machine before the profession. The machine is capable of three different forms of motion, operated by a lever. When this lever is in the upper position the motion is of a strictly blowing form. In the middle position there is a mixed or alternating motion of a blowing and sucking action. This air-passage is entirely of a sucking nature. To the end of the rubber tubing that is connected with the pump I attach little glass tubes, blown in innumerable shapes, in order to fit the variations in form of the different parts of the mucous membrane. I have great hopes of its becoming particularly efficacious in the treatment of erosion. Mr. Wappler is present this evening, and after the meeting will be pleased to demonstrate its use to any of the gentlemen sufficiently interested in it.

Dr. H. W. GILLETT, of Newport. I think the key to what I can say that may be of possible advantage to you is contained in what Dr. LeRoy stated. The object of my coming here was chiefly to show the most perfect cataphoric appliance and the most satisfactory means of warming a current of compressed air that I have yet found. Unless I am able to report further progress or see reason to retract from my present position, I intend this to be my closing word on cataphoresis.

Concerning the appliances, I regret that the warm air syringe is not here this evening. I have been waiting a long time for a successful appliance of this sort, feeling that in a certain class of cavities the satisfactory treatment of sensitive dentin depended upon our ability to warm a current of compressed air in such a manner that we might start our treatment with a current of air at very low pressure, and be able to increase it at will to the maximum, and at the same time to start the current at a temperature which should approximate blood-heat, and increase that at will to such maximum as we found satisfactory. The syringe which I used this afternoon is the first one that has realized my ideal, and after nearly a year's use of it I felt interested to state that fact. I showed it this afternoon, and the paper,* when it is published, will contain an explanation of it.

What I had to say about the cataphoric appliance related to the outfit before you, or rather part of it. Only part of this outfit is for cataphoresis. It was fully explained in my paper.

I may perhaps be pardoned for repeating the statement that I disagree very radically with the men who have expressed the opinion that cataphoresis is doing injury in the unintentional destruction of the tooth-pulp. I have yet to see the evidence of it in my own practice, and I think that covers as wide a period as that of any writer on the subject. I have no interest to urge cataphoresis upon the profession. It has very marked limitations, but I am willing to say publicly what I said once or twice privately to-day, that so long as cataphoresis continues to enable me to accomplish for my patients, in my efforts to be of service to them, what it has been accomplishing throughout the five years or more of my use of it, I anticipate continuing its use till something else shall enable me to do still better.

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*Printed in full at page 860 of the current number.

As to the clinic given this afternoon with cataphoresis, it was very nearly a failure, but could have been made an entire success in private practice.

The clinic with dehydration seemed to me an entire success. The sensitiveness was absolutely controlled by the current of warm compressed air, so that the cavity was cut out as thoroughly as there was any occasion to cut it. It was done more rapidly and more satisfactorily than could have been done by cataphoresis, or by any method that I know of. Others perhaps gain larger success by some other methods in cavities of that class.

Dr. WM. JARVIE. Both of these methods were to produce the same result?

Dr. GILLETT. Yes.

Dr. JARVIE. And if the latter was done in much less time, would not that be superior? There must be some reason why you use cataphoresis in some cases and compressed air in others.

Dr. GILLETT. The reason I use warm compressed air for one class of cavities and not for another is that in buccal and labial cavities I am very apt to succeed with it, while with corono-approximal cavities in bicuspids and molars, and approximal cavities in other teeth where I wish to do wide cutting, I do not succeed. I assume that the proximity of the pulp in the approximal cavities may be an important factor.

Dr. M. L. RHEIN. The little I saw of Dr. Gillett's clinic interested me very greatly. I feel like emphasizing the point that Dr. Gillett referred to at the close, in reply to Dr. Jarvie's question. There are places in the mouth where hot compressed air is of no avail in performing an operation for certain classes of people who want it performed painlessly, and where the only thing that seems to answer the bill is cataphoresis. It has answered it successfully for me ever since I have undertaken it. When I say successfully, of course there are exceptions to the success of everything in professional work, but those exceptions are so rare as not to interfere with the magnificent success cataphoresis is in doing painless excavating in certain portions of the teeth that other obtundents fail to relieve.

Dr. J. ADAMS BISHOP. My remarks this evening will be short and to the point. At our last monthly meeting Dr. Dawbarn read you a paper treating of surgery of the mouth and its adjacent regions. It was evident that we were all greatly interested in the paper, and paid the closest attention to his description of cases of tumors and cancerous growths of the mouth, which require such serious operations as to carry with them the teeth, and frequently the maxilla, leaving the patient in a crippled condition. I was sorry the doctor did not go a little further and tell you of the treatment required by such cases after the surgeons have successfully completed their operations.

At that time I was operating on a case of the same kind, endeavoring to restore by artificial means (*i.e.,* by a plate designed to fit and carry them) the parts which had been removed. This I successfully accomplished. You will perhaps remember, Mr. President, that I brought this patient to your office, and you saw the mouth both with and without the plate. I have here with me, and I should like to have you examine, these models, one showing the deformity, the other showing how closely we can follow and imitate nature.

I esteem as a very high calling a profession such as ours, which enables us, as in these cases, to return a man to his proper relation to society and business.

Dr. R. OTTOLENGUI then read the paper of the evening, entitled "Conclusive Evidence in Relation to Jumping the Bite."*

Discussion.

Dr. DAILEY. The discussion of this paper has been merely what the essayist has accomplished. He has not stated the appliance he has used. If he would kindly state the method he used in jumping the bite it would be of interest.

Dr. OTTOLENGUI. In this last case I made a little rubber plate with an inclined plane, as I did not wish to engage the molars, because on one side one of them was loose. The restraining wire passed behind the second bicuspids. The girl can take it out with her tongue. If you will examine the models of the second set which I brought to-night you will see this, which is true in very many of these cases: that when we start with the idea of jumping the bite, keeping all the teeth in the jaw, widening that jaw and moving teeth in many positions, we make the original bite practically impossible. If you will look at the way those teeth are occluded when the case was finished, when everything was done on the upper jaw, you will see that that condition is not tenable; that is not an occlusion that a decent white man would dismiss a patient with. Yet in the next model the occlusion is fair. Now what did it? What is the use of arguments and theories? They may prove to other men that the bite cannot be jumped, but they cannot prove it to me, because I have a cabinet full of such cases.

Dr. L. C. LEROY. Dr. Talbot might almost ask the question that was asked in my presentation of a case to Dr. Kingsley not long ago, "How is it done?" I asked Dr. Kingsley what he thought of a case I showed him,—*i.e.*, jumping the bite backward,—and he said, "You have accomplished what you were after, but the Lord only knows how you did it." Dr. Jarvie says he would like to perform the operation (of jumping the bite) in many cases. In my hands, in the few cases I have operated on, I have found it a very simple operation to jump the bite, move the lower jaw forward, or skip the bite, or change the relation of the lower jaw in relation to the upper teeth without removal of the bicuspid teeth, as is generally the case, or make any change by regulation of the teeth posterior to the cuspids. I am in hopes of presenting some evidence in a few cases to sustain Dr. Ottolengui in the points he has made; one of jumping the bite forward, and another, referred to above, of jumping the bite backward; that is, drawing the jaw backward instead of forward, causing the teeth of the lower jaw to bite backward the width of a bicuspid, instead of forward. For the want of a better term, I say "jumping the bite" backward. I do not know what other appellation to give it. I will present the case in due time, and we might find a name for it.

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*Printed in full at page 843 of the current number.

Dr. DAILEY. I would like to ask Dr. Ottolengui if it is his usual method to extract the first molars? In Fig. A do you extract the first bicuspids or first molars?

Dr. OTTOLENGUI. No. We expand the jaw and jump the bite. I do not mean to be understood that I never extract any teeth in case of protrusion. Where the chin is in a proper position, the posterior teeth occluding naturally, and you have a prominence in the upper jaw it may become necessary to take out two upper teeth. I have a case now where there was a prominence of the upper and lower jaws. They occluded naturally, but gave the girl the appearance of a monkey. This necessitated the extraction of teeth in the lower and upper jaws. I do not usually extract teeth where we jump the bite. When the chin is in proper position, when we have Fig. A, or Fig. B, or Fig. D come to us (and it must be understood that in all those cases the forehead and chin are identical), we do not need to extract any teeth.

Dr. DAILEY. I have had about forty cases of Fig. A. I jumped the bite in two cases, and in others I extracted.

Dr. OTTOLENGUI. That is good evidence, if you jumped the bite in two instances. I hope in the other thirty-eight the chin was in the proper position. Suppose in the thirty-eight cases where you did not jump the bite the relation between the forehead and chin was as it is here in Fig. C, and you then had that prominence; you could take out as many teeth as you liked to carry it back and I would not object.

Dr. J. H. HANNING. Some time ago I presented a case at a clinic of this society of a young lady who lost the body of the lower jaw from scarlet fever, and the complications following. I retracted the upper incisors and cuspids, and, after finishing that, the chin presented such a receding appearance that Dr. Ottolengui suggested jumping the bite. The apparatus was put in, and the bite was jumped; there was only one limitation, and that was the condyles of the upper jaw striking the rami.

Dr. DAILEY. Dr. Ottolengui said in Fig. A that they either jumped the bite or extracted the first bicuspids or molars. Is Fig. D the result in any of such cases?

Dr. OTTOLENGUI. These facial outlines were drawn on a piece of cardboard, and then cut out; and that cardboard was put on a piece of paper and a line drawn around it. Then the cardboard was moved to the next figure, and with compasses a line measured from the tip of the nose to the nose of the new figure, and the tip of the chin to the chin of the new figure, to get the slant identical. These faces superimpose identically on one another. We have merely altered the mouth parts and the chin. We had duplicate parts, which were slipped back and put in these positions. The Figs. A and D are identical, except as to the upper lip. In the mouth things would be worse. We have rigid lines here, and I have followed them in order to be accurate. In a human face we would have the lip turned up, and after correction we would not see so much red.

Dr. W. J. TURNER. The question has been asked here as to what change takes place in the glenoid fossa after the bite has been jumped, and if it is still possible to place the jaw in its previous backward position, or is it fixed in the forward position?

Dr. OTTOLENGUI. I will simply say this: what happens in the glenoid fossa is a matter of absolute indifference to me. All I care about is the knowledge that the thing can be done. I leave what happens in the glenoid fossa to Dr. Cryer and other men who are interested in articulation. All of you who are present can close your teeth naturally; now move the lower jaw forward as far as possible. I think you will find you can carry your lower jaw much beyond your upper incisor teeth. What happens in the glenoid fossa? You do not know, and you do not care; you can do it. That is exactly what all these children can do. I put something in the mouth to make it more comfortable for them to bite where I want them to bite than anywhere else. I leave it there, and after a few months the new habit is formed. It might be possible for the child to carry this jaw back, but not when it is in occlusion, because the new occlusion will lock it in position. If in a normal jaw, such as ours, there would be a motion of possibly half an inch, if you can move the lower jaw from the most posterior bite to the most forward bite that distance, you would find that that class of children have more mobility in their jaws,—from which I theorize that, instead of the position being due to arrested development, as Dr. Talbot says, the jaw has retreated; that it was normally intended that that jaw should bite in the forward position, and some freak of eruption in the upper and lower jaws has crowded the jaw back to its utmost backward limit, for which reason that child has the ability to move its jaw farther forward apparently than any normal child can do. We only want the width of half a bicuspid. What will that amount to in the glenoid region? It is simply a motion that the child can make; it is not a theory. I say to the child, "Move your teeth forward," and he does it, and I make a fixture so that when he bites it is more comfortable to bite there than anywhere else; and a simple inclined plane does that. There are modifications of it, of course. In a young child there might be a risk, but the child can be made to do it; and what is the use of all this speculation as to what happens in the glenoid fossa?

Dr. N. W. Kingsley. I have been told that Sandow could lift a thousand pounds. I do not believe it; I never saw him do it, and I have tried it three times and could not do it, and that proves that he could not do it. That statement is like this question of jumping the bite. I really thought it was settled long ago, but it pops up perennially. People appear to want to say something to get into print, and so they dispute a long-established practice. Dr. Ottolengui has anticipated much that I intended to say. There is no question about the possibility of doing it; it can be done. It is being done. If a man says he cannot do it, he simply shows his lack of skill.

W. J. Turner, M.D., D.D.S.,
Editor New York Odontological Society.

THIRD INTERNATIONAL DENTAL CONGRESS.

The Third International Dental Congress convened in Paris on Wednesday morning, August 8, 1900, in the Palais des Congrès, one of the principal buildings of the Exposition Universelle, in which all the world's congresses which are being held in connection with the great exposition convene.

The main hall of the building is a spacious room capable of seating not less than two thousand persons. There were present upward of twelve hundred delegates and their friends. Upon a large platform were assembled the presiding officers, the officials of the Congress, and the delegates from the several nations represented. The president of the Congress, Monsieur le Professeur Brouardel, dean of the Medical Faculty of Paris, who was to have presided, was unable to do so owing to illness, and in his absence Monsieur Godon presided.

M. Gariel, professor of the Medical Faculty, member of the Institute, and delegate of the French government, in the absence through indisposition of the president, M. Brouardel, gave the opening address. He expressed pleasure at the number of members present at the opening of the Congress, and his hopes that the meetings would further not only science, but amicable feeling between the several nations represented in the assembly.

M. Godon, professor in l'Ecole Dentaire de Paris, and president of the Congress, then delivered his address:

Mr. President, gentlemen delegates, esteemed *confrères:* In the name of the Commission d'Organisation and in the name of the dental societies of France I welcome you to this Palais des Congrès, where we are to-day officially received by the delegate of the government of the republic, Professor Gariel, who has kindly consented to honor with his presence this great reunion of dentists of the world, and who has so largely contributed to the success of all the congresses, and to ours in particular. I welcome you, gentlemen delegates of governments, universities, societies, and schools. I welcome you, gentlemen members of the foreign national committees, who have given us such valuable help. I welcome my *confrères* of all countries, who by their presence and works have added brilliancy and authority to this great and beautiful reunion.

This Congress is the largest of dental conventions ever held, and, judging from the great number of its members, we can say that it is also the most authoritative one. And when we see the program, in which appear the names of so many who have acquired notability during the past twenty-five years, we have great hopes that it will be the most important in regard to scientific and professional results.

I do not need to speak on the purpose and utility of congresses, and their influence on the progress of science and arts. They complete expositions, and that of 1900 in particular could not depart from this tradition. Is not the living encyclopedia of the end of the nineteenth century worthy of being the continuation of that of philosophers and learned men of the eighteenth century? What ought to be the position of our science in this new encyclopedia? Have we not several scientific congresses? And have we not those of the medical sciences in particular through which to make known our existence?

Those congresses were open to us on account of the social and legal position which the surgeon-dentist of to-day occupies everywhere, and you know that we had very little work to do in order to throw open that door which they pretended to close to us, notwithstanding laws and regulations; and that we also destroyed their pretensions in setting up archaic distinctions. It was then, voluntarily, and after much consideration, that the organizers of this reunion decided on having a special congress for our special science. They thought, like the organizers of the First International Congress at Paris in 1889, and those of the second at Chicago, 1893, that the time had come when, as the result of the extension of its scientific field and in conformity with the laws on the economical division of work, dentistry had the right to be placed among the special sciences.

I am also authorized to so proclaim it, since in 1889 my predecessor, Dr. David, formulated that principle by saying that in proportion as our field extends and that the teaching of our science becomes more difficult, the greater is the necessity of having special workmen. Dentistry can be considered to-day as a science. This science required a special plan, one adapting itself to the many peculiarities of our specialty. It is only necessary to consider the development of this organization, with its ten sections, to understand that it would have been impossible to include it in the plan of the large congress of the medical sciences. The results attained speak for themselves.

You must not conclude from these facts that we refused to take part in the Scientific and Medical Congress, and that we criticise the creation of an odontological section in them. Certainly not; we would attend them every time if we were invited in the right way and were sure of the exclusion of all forms of hostile feeling.

When the dean of the Faculty of Medicine of Paris, with the authority which belongs to his name and to his official position, told us in a recent public function that the surgeon-dentists were part of the great medical family, was that not a recognition that our specialty would in the future occupy a position among the medical sciences? But what position?

The dentist is a little like a sentinel at the door of the human citadel, as a part of its defense with physicians and surgeons; often, indeed, it is he who sounds the first alarm that the whole organism is in danger. He protects the region he is charged to guard against disease. If it is destroyed he restores it, re-establishes it to such a degree as to restore its physiological function, which was believed to have been lost.

It is just the peculiar character of this intervention which creates for him a position apart among those who devote themselves to the preservation of the human being. So that it can be said that dentistry is the most specialized, the most distinctive, and the most autonomous among the medical sciences.

It will be the purpose of this Congress to emphasize in an indisputable way the correctness of this statement, showing the degree of development and of perfection to which odontological science and its different branches has attained at the end of the nineteenth century.

If we follow the evolution of dental science through ages, peoples, and civilizations, its history is the same as that of all modern sciences. Progress has been attained in this case, and just as in the case of other sciences, out of a singular mixture of superstitions, prejudices, empiricisms, and unceasing labors. The learned man and the modest practitioner have contributed their precious share, and we owe to both equal gratitude.

It will suffice to refer to certain phases of this history, such as are presented in the work of this Congress, to justify such a conclusion. Let us recall, say, the Romans at the time of the Emperor Domitian, or the Mount Aventin, where Cascellius, an old liberated slave, practiced on the elegant courtesans and on the beautiful patricians the little knowledge of dentistry that he had,—a knowledge which originated with Hippocrates, was transmitted by Celsus, and which we find a little increased in Galen.

Ten centuries later, at the time of the splendors of the Khalifat of Cordova, we find an empiric who practiced his art on the Moorish, as described by Abulcasis.

Let us stop before the paintings of Gerard Dow, the great Dutch painter, who six hundred years later painted the scenes of the professional life of a dentist in the sixteenth century, whose knowledge and science all came from Ambroise Paré.

The advances of our art have been far from being regular. They have followed those of the sciences and arts in all civilizations, and seem, with them, to have disappeared or to have been lost in troublous times. But very soon, when calmness was again re-established, we find the interrupted chain again, just as the river which abruptly disappears in an abyss reappears again among the valleys it fertilizes. But at the same time, if we consider the slowness of this march during the first centuries, we are entirely astonished to observe the greatness of the progress accomplished within the last two hundred years.

It is since the time of Fauchard, who was justly called the father of modern odontology, the author of the first nearly complete work on dental art, and whose title, "The Surgeon Dentist," was the first affirmation of our title,—it is since that time that the great scientific works of John Hunter, Bell, etc., have appeared, and it is also since that time that the most important discoveries have been made. That of the porcelain tooth, by Duchateau, and that of Dubois de Chemant, founder of modern dental prosthesis, are at the head of the list. Since that time science and technique have worked hand in hand, and made rapid progress all around the world. Dental surgery, operative dentistry, prosthetic dentistry, have improved daily.

One name must occupy in this history an entirely reserved place; not on account of the humble practitioner who was its bearer, but on account of his great discovery, which stands high above the man and the profession. I name Horace Wells, and I refer to the discovery of anesthesia. In vain have efforts been made to diminish the importance of this discovery, because of the commonplace circumstances under which it was made. But is not the history of science full of just such achievements? Archimedes' bath, Galileo's lamp, Newton's apple, are a few examples. Horace Wells, the modest dentist of Hartford, knew how to make out of a laboratory discovery due to Priestley and Humphry Davy a useful application for the extinction of human suffering. This feat is enough for humanity to grant him an eternal vote of gratitude. When discoveries of this character get on a solid basis, empiricism gives up its place to scientific procedures and methods.

It is to our American *confrères* that we are indebted for the progress realized in the first part of the present century; it is to them that we owe the formation of those three organs that have made odontological science a great factor. I mean the school, the association, and the journal. It is to Harris and his co-workers that belongs the honor of having realized this important trilogy upon which modern progress reposes. The technical school is open to everybody, and replaces the apprenticeship; the association uniting men of the same profession; the journal spreading new knowledge and taking us out of difficulty.

These creations are only sixty years old. They have been followed in every country, producing excellent results. It is to them that we owe the presence of such a great number of members in this Congress, and it is also because of them and their works that the members have been able to prepare themselves for this specific battle. They have also given to the profession the general lines of the science of to-day. No more secret remedies; no more closed laboratories. Discoveries belong to-day to humanity, and honor and gratitude to those who make them. No more misunderstandings arising from old parchments. Modern science is experimental. She unites in a holy communion the thinkers and the workers, those working in pure science with those working in applied science. They all labor for the welfare of humanity.

One illustrious name predominates above all others in the history of this century, whose bearer, just as Fauchard, combined scientific and technical work for the benefit of the profession. I mean John Tomes, celebrated for his studies on the dentin and the dentinal fibers, for his work in clinical dentistry, and for his discovery of the modern forceps. Sir John Tomes symbolizes the dental surgeon of the nineteenth century, as Fauchard him of the eighteenth. Honor to him!

We might speak of many others who, in the United States, in England, in Germany, in Austria, in France, and in all the countries that you represent, have honored our art and have increased its patrimony during this last century. You will pay to them in your respective sections due homage, and in so doing you will inscribe the roll of those who will figure in the Pantheon of our professional history; men whom we will mention in our schools, to make them the object of the admiration and the gratitude of our new generation. Let me, however, in passing salute the memories of Bonwill and Dubois, names engraved in the minds of all.

I will ask you before closing to remember what the organizers of this Congress, the dental societies of France and of other countries, expect from you. They wanted this Congress to have a scientific, a technical, a professional, and a social purpose. This is the reason why we appealed to the sages, the technologists, the teachers, the jurists, and the hygienists of our profession.

And now I shall address myself to the organizers of our ten sections. It is you who have constituted this Congress, and who will assure its success. The Congress depends on you to give the results which can be expected from such an assembly, for the benefit of our technique and our profession.

You, gentlemen, members of the scientific sections, see to it that we shall be, after your discussions are over, more enlightened on the phenomena of the intimate relations of dental tissues; on the organic changes of the dentinal fibers; on the changes in the circulation and nutrition of the pulp and pericementum; on the natural history of those microbes which develop in dental media. And also enlighten us in the pathology of pyorrhea alveolaris; the degree of influence of the microbe and of diathesis on its development; on the disturbances of the salivary secretion; on the methods of defense of the oral cavity, and on preventing the development of those diseases we have to fight against.

You, gentlemen of the technical sections, Nos. III, IV, V, IX, show us the new methods and materials that you intend to use in order to attack recurrent caries; the cause of the despair of the conscientious practitioner, who thought that with a carefully inserted filling of gold, cement, amalgam, or porcelain he could assure the antisepsis of the cavity and finally arrest the progress of decay.

To you, gentlemen of the fourth section, we ask you to complete the marvelous application of general and local anesthesia. It is yours to tell us the best practical agent for securing insensibility of the pulp during resection; electricity and improved cataphoresis, refrigerating compounds, or cocain and its derivatives.

And you, the prosthetists, who, with your crown- and bridge-work systems, possess already a most ingenious system for restoring the teeth to usefulness, show us better methods of retaining dental appliances, some system superior to clasps or air-chamber plates covering the palate; simplify regulating appliances so that they will not fill up the mouths of children; and also show us the ingenious appliances that we owe to the ingenuity of certain of our *confrères* in the mechanics of buccal restorations.

Gentlemen, members of the section on professional and social order, show us the teaching methods of the dental schools of the United States, England, Germany, Switzerland, France; and tell us the necessary modifications in order that future practitioners shall be a great deal more advanced scientifically, medically, and technically. Tell us what we have to add to or to subtract from the scientific or technical side, so that the young dentist shall, after the normal period of study, not merely know enough not to cause harm, but shall be capable of rendering conscientious professional services.

And you, the jurists, you will tell us why the laws which govern our practice are so different in every country. You will tell us why in the North the regulations are limited to the degree, while in the South degree and license are under strict rules. You will appreciate by yourselves the value of these several legislations.

You, the members of the eighth section, whose numerous papers show of how much interest the social activities of our art are to the dentists of all countries, you will tell us the reason why in the majority of civilized countries and in all great centers school children, soldiers of the armies and navies, laborers, poor and sick people in the hospitals and almshouses are treated according to the therapeutics of the time of Ambroise Paré,—a small dressing, more or less soothing, and the barbarous extraction. Is this the fault of our special science? The works of the technicians of the ninth section are there to prove that the progress of our art does not permit of such a practice. Is this, in that case, due to the dentist's lack in philanthropy? It will suffice to mention the great number of gratuitous dispensaries to which they contribute their disinterested services. Is this, then, due to their apathy? Their petitions to the public powers prove the contrary.

Is this, then, due to the negligence of governments of every country, or to their ignorance in the progress of our art? If it is so, if you think it, you should speak out plainly and resolutely, to the end that the permanent committee which will arise from this Congress may raise such a clamor that the men charged to govern us shall hear it, despite absorption in their occupations; and that in any case, if, after this Congress, any laborer, any soldier, shall suffer still from this carelessness one cannot say that dental science has failed.

It is for this work that the Commission d'Organisation of the

Third International Dental Congress has invited you, and it is without a doubt that this work is the aim of your science and endeavors. You will make odontologic science sparkle more brilliantly through your works during this short week, just as gold at the bottom of a crucible appears purer at each new melting; and then you will have served the cause of progress.

I thank you for having come in such great numbers to this tribunal of the profession. I thank you for having had confidence in the old French hospitality. I thank you in the name of the dentists of France, in whom you placed your confidence for the organization and direction of these discussions. They are conscious of the great honor you have paid to them.

Let us work, then, for the benefit of odontologic science and humanity.

Dr. SAUVEZ, general secretary, read his report, in which he gave the history of the Congress, its objects, hopes, and efforts. He described how the Congress had been divided into sections and groups, in order that its work might be facilitated. He showed by what guarantees its constitution has been surrounded, and expressed the hope that the organization might continue under the name of a permanent federation, whose duty it should be to work for the general good of the profession.

M. VIAU, professor in l'Ecole Dentaire de Paris, the general treasurer, in a brief financial *exposé* gave some statistics of the Congress, and indicated the success which had attended the efforts of its organizers by the large number of members enrolled, exceeding any previous congress.

M. GARIEL, principal delegate of the government, welcomed the foreign delegates in the name of the French republic, and then spoke of the future working of the Congress. He formally declared the Congress opened, and proposed the following as honorary presidents:

Professor Dr. Hesse, of Leipsic, for Germany.

Dr. Med. Johann Franck, Vienna, for Austria.

Mr. George Brunton, of Leeds, for England.

Dr. A. W. Harlan, of Chicago, for America.

Professor E. Lecaudey, for France, who were all unanimously agreed upon.

The following were then proposed as honorary chairmen of the various sections, and their selection was unanimously approved of:

Section I—Mr. J. Howard Mummery, Dr. E. C. Kirk, Dr. Zsigmondy, Dr. Grevers.

Section II—Dr. J. Leon Williams, Dr. Isaac B. Davenport, Mlle. Port, Dr. Avanzi.

Section III—M. William Hern, Dr. G. C. Daboll, M. Heitmuller, Dr. Frick.

Section IV—M. Woodhouse, Dr. W. E. Griswold, M. Bleichsteiner, Dr. Messian.

Section V—Mr. Booth Pearsall, Dr. C. S. Case, Herbst, Portuondo.

Section VI—Mr. E. Lloyd Williams, Dr. W. W. Walker, Dr. Joh. Franck, Ayrapaa (Europe).

Section VII—Mr. Paterson, Dr. T. W. Brophy, Dr. Franck, Dr. Florestan Aguilar.

Section VIII—Mr. Hutchinson, Dr. Gordon White, Jesseu, Dr. Limberg.

It was also moved and carried that a permanent committee be nominated to perpetuate the work of the Congress; the names of those to constitute the committee to be suggested later.

The several delegates of the nations represented at the Congress then expressed their sense of the honor done them by the invitation to join the Congress, and their pleasure at being able to attend. These were Dr. Hesse, for Germany; Mr. Geo. Brunton, for England; Dr. Franck, for Austria; M. Baruch, for Belgium; M. Heidé, for Denmark and Norway; M. Aguilar, for Spain; Dr. Harlan, for the United States; M. Grevers, for the Netherlands; M. Sjöberg, for Sweden; M. Guillermin, for Switzerland; Mr. Ayrapaa, for the Odontological Society of Finland; Mr. Geo. Cunningham, for Cambridge University. All expressed the hope that the Congress might be profitable, and that its effects might be felt not only through France, but throughout the civilized world.

The opening exercises closed at twelve o'clock, and the Congress adjourned to reconvene in general session at 1.30 P.M. at the Hotel des Sociétés Savantes, rue Serpente, in which building the general sessions and several section meetings of the Congress were held.

First General Session.

After a few words of welcome, the president, M. Godon, pronounced the meeting open, and called upon Mr. J. Howard Mummery, of London, to read his paper, entitled,—

Are the Spore-like Bodies described as Leptothrix Racemosa by Vicentini Examples of Pure Sporulation?

Dr. Vicentini describes an organism which he always finds in great numbers in the mouth, and which he calls Leptothrix racemosa. He describes this organism as presenting four stages in its development, the highest phase having a regular arrangement of spores around a central rod. This arrangement forms mallet-shaped masses. He thinks that these bodies are spores which separate in the mouth, producing with the Leptothrix threads, which are also at liberty, a lower phase of this plant.

Dr. Vicentini thinks that the organism which produces the spore is a form related to all, or nearly all, of the bacteria found in the mouth and the saliva, and that the filaments until now described as the Leptothrix threads are only portions of the most important phase of this plant, which seems to germinate and fructify over the teeth.

He describes the parent organism as one composed of fruitful filaments, or of a rod, generally thin, containing internal parietal *gemmules* (small gemma or buds), which are distinctly shown by means of gentian-violet stains. Over this rod small peduncles, or very delicate threads, are found. These threads support the spores, just as the sterigmata of many fungi. The spores are of globular shape, showing a pale color in iodin solution, becoming colored when subjected to anilin stains. A viscid substance covers the rod and spores. These spores are distributed over the rod in six longitudinal series.

In 1893 the author of this communication examined with Dr. Miller the substance deposited upon the teeth. At that time Dr. Miller had received an account of the work of Dr. Vicentini, by whom he had been asked to confirm his investigations. Following the indications given in the communication, we discovered the club-shaped bodies which had been alluded to. We also discovered the arrangement of the spore-like bodies over the central rod, but we could not affirm that we had seen the small threads which fasten the spores to the central rod.

In 1898 Dr. J. Leon Williams, who had not seen the report of Dr. Vicentini, nor the author's review of it which was published in the reports of the Odontological Society of Great Britain, made an independent observation of these forms of cocci grouped around what he considers as the Leptothrix threads, and he has since stated that they could not be an accidental accumulation, but that they indicated the presence of a distinct organism; and that by means of his method of preparation and his photographic slides he could show the existence of these small filaments grouped between the spores and cocci and the principal rod.

These organisms are found in great abundance in all mouths; the proliferating bodies are found principally in the substance deposited upon the teeth and between the interdental spaces. They were first discovered by Vicentini, who treated the depositing substance with a one per cent. solution of lactic acid, followed by tincture of iodin. Dr. Williams stained his preparations with a solution of methyl-violet and anilin water, mounting his preparations with glycerol, alcohol, and water in similar proportions. This author believes that one of the principal reasons why these organisms have been so rarely shown arises from the mounting, Canada balsam being an inappropriate medium.

What conclusion can be drawn from Dr. Vicentini's discovery? It is, indeed, a very interesting one for the bacteriologist, because it shows an organism which grows abundantly in all mouths, and which seems to be of greater importance than those small elements, the filamentous cocci, and the bacilli, to which all our attention has been directed. If the organisms alluded to are spores, it would seem that we have at the entrance of the alimentary canal an abundant growth which must be of great significance to the general economy. And it is curious to note that such an interesting observation should have received so little attention. Similar forms can yet be found in other parts of the body, and we must remember that it has been only through a particular method of preparation that these little organisms have been discovered.

On the conclusion of this paper Dr. d'ARGENT said he felt that he would be expressing not only his own, but the wishes of many of his colleagues, when he said that it was a great deprivation that, owing to his ignorance of English, he had been unable to properly follow the explanations given by Dr. Mummery of his lantern projections, and asked the president to kindly allow Dr. Mummery to show the slides again while an interpreter explained them in French. The papers, said Dr. d'Argent, were all published for the members to read, if they chose, and the reading of such papers in open assembly might therefore be dispensed with, while the time thus saved would be usefully employed in detailing other matters which would now have to be slurred over for lack of time.

The president replied that while he quite recognized the disadvantages arising from not understanding a language, yet if explanations of the lantern projections, etc., were to be translated into the languages of all the nations represented it would be quite impossible to get through the program of the Congress. If, therefore, permission was granted to have the pictures, etc., explained in the language of the speaker *and* in French, that would be the utmost that could be granted.

Mr. Mummery's slides were therefore to be explained again later on in the proceedings.

Dr. SCHWARTZ, of Leipsic, then rose to express his great sense of the importance of Dr. Mummery's researches, and his regret that up to the present they have failed to attract all the attention they deserve. He mentioned experiments which he had made himself, and which had led him to similar conclusions. He had noticed that in very dirty mouths these organisms were always to be found as described, and he hoped to be able to show to the Congress some good results of the culture of these organisms, according to Dr. Peret's method. He therefore expressed the wish to see Drs. Mummery and Williams devote themselves to the study of these organisms, a study which certainly reserves for science some interesting discoveries.

(To be continued.)

NATIONAL DENTAL ASSOCIATION.

THE National Dental Association held its third annual meeting at Old Point Comfort, Va., commencing Tuesday, July 10, 1900.

The general sessions were held in the dancing hall of the Hotel Chamberlin. There was a very good attendance of members; considerably more than the average of late years, and somewhat more than at the meeting at Niagara Falls last year.

FIRST DAY—*Morning Session.*

The association was called to order by the president, Dr. B. HOLLY SMITH, of Baltimore, at 11.10 A.M.

Dr. J. TAFT, of Cincinnati, invoked the Divine blessing.

The Executive Council reported through Dr. H. J. BURKHART, the chairman, that it had decided that the change of the date of the meeting had been ratified; that Dr. A. H. Peck, of Chicago, the assistant secretary, act as secretary; that the president's address be the next order of business; that the hour for the opening of the evening sessions shall be eight o'clock; that the council would hold a session at four o'clock to hear matters which members might wish to present. The report was adopted.

The president called Dr. M. F. Finley, of Washington, vice-president for the South, to the chair, and read the annual address, as follows:

MEMBERS OF THE NATIONAL DENTAL ASSOCIATION:

I greet you with feelings of congratulation and pleasure on this the occasion of our third annual meeting. Although such a short time has elapsed since this organization was effected, it has been sufficiently long for us to see the association grow into the confidence and esteem of the entire dental world, and to hear on every hand expressions of hopefulness and encouragement. If I may speak for those who labored to form this society, I will say that even the most enthusiastic and sanguine did not look upon the original organization as the end of all to be desired, but simply as a faltering beginning of a concentration of influence and effort which would ultimately develop into a power for good indispensable to the dental profession. It never was thought that the plan upon which the organization was made was anything more than that most feasible for the time being. Many features at first considered essential had to be abandoned because of differences of opinion. The chief desire of its founders and supporters was that it might survive for a year or two without serious friction or rupture, until confidence was strengthened and generous co-operation assured.

It is undeniable that in this, as in all new enterprises, objections both to the scope and plan of the work have arisen. Impatience and resentment toward those who would thus hinder our association in its onward progress are unwise and ill-advised. Opposition must be met with hopeful tolerance and brotherly conference until we become indeed a unit in thought and purpose. The strong and lusty must not despise the weak and timid. This organization is essential to the progress of professional interests and the development of scientific research. Let us cheerfully accord to it, therefore, our loyal support, and willingly make what sacrifices we are called upon to make for the advancement of its interests.

It is of vital importance to the purposes of this association to establish and strengthen an influential, if not authoritative, relation between this and other dental organizations. The National Association of Dental Faculties, the National Association of Dental Examiners, the Institute of Dental Pedagogics, the branches, the state and local societies, should all hold allegiance to this body. Even though this allegiance would cost some slight sacrifice, it can be readily seen that the loyal union would strengthen immeasurably the influence and helpfulness of the thus-constituted parent organization; give force and power to its edicts both at home and abroad; make it a court of arbitration for the settlement of differences; assist its officers and commissions in the collection of statistics and data, and enable it to foster without hindrance research and investigation.

Unquestionably the reputation of American dentistry in foreign countries has suffered greatly in the past from misrepresentation and fraud, until to-day our diplomas and training are dishonored in most foreign lands. There is but one remedy for this, and that the sovereign balm for all jealousies and backbitings, that God-given beneficent influence which we call fraternity. Much might be done to strengthen this by the establishment of associate membership in this association, a non-resident relation which might be tendered after correspondence to one or a number of members of the various foreign dental organizations, to be filled by election or appointment of these societies. This would put us in touch not only with the sympathies but the thought of our brethren in other lands. They might visit us, contribute to our work, and truthfully represent us in their localities. Especially we should invite those who speak our tongue to be represented. Americans in foreign countries might make the meetings of this association the season of their home-coming. The Committee on Foreign Relations of the National Association of Dental Faculties and the American Dental Society of Europe have done some good work in this direction. We feel assured that if this work of fraternizing is diligently pursued, the day is not far distant when the American dentist will be welcome the world over, and his achievements and accomplishments cheerfully acknowledged.

The meeting of the International Dental Congress in Paris next month would be a very opportune time for the promulgation by our committee of a desire on the part of this association to establish permanent relations of affiliation with the various dental organizations of the world, and I suggest that a formal communication of this character be presented by the chairman of the committee.

The normal function of this association, let us hope, will never cease to be educational. We do not believe, however, that the greatest good can be accomplished on the desultory lines of its present plan of work. The annual exhibition of papers and methods of practice cannot be dispensed with, but there must be co-ordination of effort. There must be appointed commissions, backed by the authority of the association to collect data, to prosecute research, and these commissions must be selected with a view to their special fitness for the task assigned. It is not enough that any ordinary dentist without special training or thought, but with commendable willingness, should read an amateurish essay before a section of this body, leaving the subject just where it was before, save for marks of a few drops of perspiration from the tyro; this is not the place for kindergarten work. Instead, the commission should have the time arranged for the presentation of a report of the year's work and correspondence of each member, to be followed by a succinct chart of essentials and deductions, the essence and outcome of the work of the year. This would be a peg from which to start succeeding efforts. Real progress could be made, and true knowledge gained. This desultory reading of papers on the same subjects rehashes, last year, this year, and next year, the same thing over and over again, makes much reading a weariness of the flesh, and deprives our association of any distinctive character. These commissions might be organized under the authority of the sections, and their reports, when printed, would be more valuable than the text-books or works of reference, in that they would be the latest authoritative statement of the profession on the subject. They might include readily deductions from work done before other organizations without impairing their quality.

Too many papers are being published. The local society is the place for the nestling to try his wings, but too wide publication of these trials results in confusion and deters progress. Not a year goes by that we do not see papers giving in minutest detail methods which were old twenty years ago. The preparation of such a paper was helpful perhaps to the author, and because it stirred the sympathy of the society for the essayist, bringing brethren in a common cause closer together, it is helpful generally. But must this be the representative literature of our noble calling? The dental journal publishing the proceedings of a dental society has difficulty in rejecting commonplace papers, but it ought to be a crime for a journal to reprint twaddle. It would be difficult to conceive the amount of energy and time which has been expended by misdirected members of our profession in rewriting and promulgating theories and methods of practice which to the initiated are old and often *passé*. If this organization through its organized effort will but settle some methods of practice, recognize some as superior and denounce the spurious and false, order may be brought out of chaos.

In order to assure the successful performance of the work of commissions, it is important that a semi-annual report be made by the chairman of the commission to the chairman of the section under which the commission is working. With a half-dozen or a dozen such divisions of our best workers so engaged, might we not, at the expiration of a year, be able to say as a profession what is true, what is false; what is advisable, what is to be avoided?

I would suggest the appointment by each of the sections of two commissions of five members each. Let the chairmen of the sections outline the scope and field of work. Let the commissions report unfailingly to the sections at the annual meeting, and let the association give time at least for the presentation before the general body of a *résumé* of this report.

This will insure activity all along the line, while under the present plan of procedure some sections present no papers, possibly because of a fear that there would not be opportunity for all to be given a hearing. There certainly can be said to be no specific progress in such sections. Was not this organization effected for general usefulness and advancement? Should any section lack a hearing? Through every ramification of this organization should beat a pulse whose systole should be felt by every member, and that without more than normal effort, if we will but put ourselves in touch with the great heart of professional progress. Desultory and unorganized effort gains but meager results; organized and concentrated labor sweeps on to the vantage ground of assured and definite results.

I would suggest that a most fitting subject for the consideration of one of these commissions would be the preliminary training of the dental student. The dignity, erudition, and influence for good of our profession depend upon the character of men who are year by year added to our ranks. Without thought or study it is questionable whether as a whole we have any very definite idea of what is desirable preliminary training for an embryo dentist. Indeed, we believe seriously that if any concerted opinion were to be formulated from the preliminary tests which have been exacted or advocated it would be in error. Have we not been swept off our feet by such cries as "Elevate the standard of dentistry," "Is dentistry a learned profession?" etc., until mechanism and constructive power have been lightly regarded? Have we not erected an arbitrary and false division between mechanical ability and intellectual power?

In an experience of nearly twenty years as a dental educator it often has been a source of mortification to me that so many of the men who have had the advantage of extended so-called mental training, who possessed the degrees conferred by colleges and universities as an evidence of such training, made the most impossible of all material out of which to make dentists. Where could the fault be? Unquestionably in the character of the training. The motor centers had been neglected. Halleck says, "Youthful nerve-cells alone are easily developed by training; after twenty, ability comes through pain and trouble." Among the best all-around men whom I have helped into professional life, men of skill and sound judgment, have been watchmakers, and men who have served apprenticeship in machine shops, gaining a practical knowledge of the properties of metals and considerable manual dexterity in their management.

Our educational system has not yet awakened to the necessity for this kind of training. Our profession does not advocate it as it should. When on a visit of inspection to that magnificent Boston Institute of Technology, I inquired whether any dental students pursued preliminary studies there. The registrar informed me that he had never known such to be the case. There should be in such an institution a special course (perhaps shorter than any of the regular courses) for the preliminary training of dental students, and it could be, I have no doubt, through the influence of a commission from this body. Our polytechnic and manual training schools throughout the country could be made to do good service if the proper interest were taken in them and a proper course outlined for them. A feature of such a course should be the training of the senses,—tactile, auditory, optical, and olfactory.

We really believe the better and wiser solution of this question of preliminary dental training to be not so much in the fixing of some arbitrary standard, more or less debatable, more or less to be evaded, more or less the subject of misapprehension and misrepresentation. We believe we should go to the root of the matter and decide not what particular things our candidate should know, but what, essentially, the character of his preliminary training should be, and that we should base our decision in this matter upon an honest and painstaking examination of the pedagogic principles involved. What these principles are, it seems to me, we are the better able to decide, because of the avowed dependence of psychology upon physiology and the declared reliance of later psychologic authorities upon the study of material structure and physiologic properties of the brain; the scientific examination of psychologic facts and tendencies after what may be called laboratory methods.

If, then, we, as men of knowledge, experience, and judgment, can decide in what course of training are to be found the most valuable forms in which the mental power of the student should be displayed, what is the character of training most advantageous to him, and procuring for him the greatest force in his profession, without narrowing or restricting his mental horizon, it is certainly our duty to recommend such a course; nay more, it is our duty to strive with all our might to secure the establishment of such a course. Moreover, I hold it a solemn responsibility, in view of our position and influence as a society, that we examine and investigate with industry and such ability as we may command all available sources of information upon this all-important subject.

Moved, therefore, by such considerations as I have submitted above, I desire to bring to your attention some extracts from the contributions of educators and psychologists upon *The Importance of Training the Motor Centers,* and, first of all, I beg you to reflect that this importance is considered by these authorities from a general and not a specific pedagogic point of view.

Primarily, the motor area of the brain is fully one-third of the entire area, and to fail to train this part, or to train it imperfectly, brings as its result and punishment the incomplete, incapable mental action and production; an exclusion of fully one-third of intellectual capacity, power, and enjoyment.

Beyond the positive loss resulting to the individual and to the world from untrained or imperfectly trained motor areas, measured we may say by dreary and expressionless blanks in positive accumulations of knowledge, experience, and power, comes the most important function of the development of these areas in their formative influence upon the development of the mental character as a whole. For it is clearly argued and well demonstrated that through the training of the motor centers the will, the judgment, and the memory are powerfully stimulated and developed.

Edward R. Shaw (*Pop. Sci. Mo.*, vol. l) says, "Heusinger regards the impulse to activity as the regulating principle in gaining knowledge, leading to deeper knowledge of the thing itself, and a greater appreciation of all in connection with the thing to be known, and excludes things having no relation to the particular object of thought."

Physical activity is the most marked characteristic of youth, and is due to the energy which must be expended through the motor channels.

The movements of young infants are at first impulsive, then reflex; stimulated by the senses, but without premeditation; and later voluntary movements are based on memory of these impulsive and reflex movements, hence the latter influence the will.

These impulsive and reflex movements are not noticed by self-consciousness, but leave a trace in the developing brain, and when hit on again and again produce an idea, a motor idea in the dawning consciousness. These motor ideas are the foundation of deliberative or voluntary movements, and so the will develops first through the motor side.

Not only do these motor centers play a great part in the development of psychic life and the use of the will, but all other parts of the brain come to be developed in connection with them.

According to Professor Baldwin, the motor element holds sensory elements together. Dr. Crichton Browne holds that we have few if any purely sensory characteristics.

Moreover, the muscles widen the field for sense impressions, and by the experience which their own activities involve expand our mental resources a thousand-fold.

Thus it is that certain ideas, as of time, place, position, and form, are, in their basic principles, motor. These develop and render accurate the judgment by multiplying opportunities for comparison and discrimination.

It can be readily shown also that through the motor side of the brain the attention is strengthened, and the power of association intensified. According to Professor Baldwin, association has a motor foundation, and elements are held together in memory because used together in action; and as the action becomes one, though complex, so mental content becomes one, though complex. As association is stimulated through the motor side, the memory is necessarily strengthened; in fact, memory is no longer considered a faculty which takes up a content and remembers it, but is now known to be a function of the content remembered. This function depends upon variety of association and upon volition, and both of these are best built up by that which gives the fullest possible functioning of the nervous mechanism during the developing period,—*i.e.*, the fullest and most varied use of motor activities warrantable. The influence of motor cultivation and development upon the memory is then indisputable.

Again, a proper expenditure of motor energies produces an emotional state of interest and pleasure, which of itself materially strengthens the memory and the association.

The general educational value of motor training, as thus attested by eminent authority, and as it appeals to our own experience and judgment, is incontestable. Such training cannot be open then, manifestly, to any charge of restriction or narrowness, inasmuch as it tends to develop and strengthen the mental equipment of the individual. For it is through this training that the will, the judgment, and the memory are strengthened and developed.

It seems to me that another consideration of the importance of motor training arises from the peculiar benefits accruing to our profession from their fullest and most perfect cultivation. Aside from their pedagogic and psychologic value, the essential fact of capacities and powers which we may call specific and technical is to us all-important.

This training should be a most important factor of preliminary education, because the period of life in which this education should be acquired is the best adapted to its most perfect and complete effect. The formative period has not passed, and it is during this period that we may expect the motor ideas to become integral and generative, not accidental and barren. It is at this period the unconscious and subtle power must be acquired which afterward will flower into the consummate mastery of technique and manual skill. It is from preliminary training based along these lines we must hope for the production of the dental genius and master, for this it is which will make the foundation ideas of our profession so completely a part of their possessor as to seem innate and the sure basis of creative skill.

These in faint and feeble outline are some of the thoughts upon one very important factor of preliminary dental training, a factor whose importance I believe to be easily discernible, and of whose educational soundness we can have no doubt. That other requirements are also essential no one is disposed to argue. But I hope we are all enthusiastically disposed to act as a unit in securing as soon as may be the great advantages which will accrue to us professionally from a proper preliminary training of dental students, and that some active steps will be taken by this association looking toward that important end.

To those of us who reflect upon the advancement in social and scientific position of our profession, it is unfailingly interesting to study the material welfare of individual members and to compare the opportunities for improvement along this line with relative callings. The profession of dentistry has grown into a position of assured appreciation, and yet our best men, as compared with men of like rank in other callings, are but poorly paid. This cannot be ascribed to individual lack of courage, but rather to a low general estimate by most of us of what compensation good attention should command. Fees lack uniformity often because of a failure to compare notes. Young men often skillful begin the practice of dentistry without any familiarity with custom in this direction. In many sections it is the custom to make no charge for treatment and consultation. It would be both interesting and helpful to have tabulated statistics from four or five men of good standing in all the larger cities of this country and Europe. This, with the recommendation of the commission, would form a good basis for a lecture to the members of every senior class in our colleges. The publication of such a report in pamphlet form, including the code and such other recommendations as are seen fit, might be done at the expense of this association.

It must be a source of much regret that the measure so ardently and ably urged by your committee for the appointment of dentists in the army and navy failed of passage. We suggest that the present committee of three, who are familiar with the work by their associates in the various states, be empowered to retain as members those who did good service, and substitute active and energetic helpers in the place of those who did not assist. Let the fight be continued; with determined effort it must succeed.

Under the provisions of the measure there were to be appointed three examiners of superior rank. Many applicants with weighty indorsements appeared willing to accept these positions. As the president of this association I indorsed the applications prepared by the friends of Dr. Wms. Donnally, of Washington, Dr. Jno. S. Marshall, of Chicago, and Dr. V. E. Turner, of Raleigh, N. C. In an informal and friendly conversation with Surgeon-General Sternberg, he said that he would prefer the men whom he appointed to be indorsed or recommended by this association. This is a gratuitous, though very sensible, expression of confidence in this body, and it might be appropriate to decide through what department such recommendation should be given; whether through the president, Executive Committee, or Executive Council, and, if the latter, whether by individual or collective action.

We urge the continuance of this Committee on the Army and Navy Dental Legislation, and believe that its successful prosecution of the task assigned before the next Congress will serve as an additional argument for the training of commissions whose experience will be profitable to succeeding effort.

The continuous labor of the Committee on History must appeal to the consideration of this body. We suggest that the chairman have power to demand co-operation from the members of this association. The labor, apparently thankless at this hour, must increase in interest as the years advance. No thought of abandoning the purpose of its original appointment must be considered. We recommend the enlargement of the committee and a vote of encouragement and thanks for the untiring labor performed.

Committee on Museum and Library.—As the years advance there will gradually accumulate responsibilities for this association, not the least of which will be the continuance and development of an interest in the dental exhibits of the Army Medical Museum. Let us give loyal support to this effort.

The minutes of last year's meeting show that the committee appointed to report on President Burkhart's address advise the appointment of a committee to report ways and means of establishing a scientific bureau. No mention is made of such report. We suggest that the matter be referred to the section officers with power to act.

Committee on Unification of Dental Laws.—We fail to find any response to the recommendation of the Committee on President's Address that one from each state compose a committee to further this object. Let them get to work.

Those of us who are familiar with these annual gatherings remember with pleasure the genial countenance and cheerful manner of one who for years served his profession unfailingly, and whom his associates delighted to honor with the position of recording secretary of this association. Ripe in experience, rich in professional attainments, at peace with the world, in love and harmony with his profession, Dr. Cushing has rested from his labors. We honor his memory, we deplore his loss. We lovingly and tenderly record that he was "faithful unto death."

Finally, friends, I invite you to the consideration of the program prepared for this meeting by the section officers. Yielding willingly to the expressed wish of these officers, I have taken no part in the preparation of this feast. I am of the opinion that if we accomplish substantial progress it must be through the organized and united effort of the many, rather than through the exertions of the presiding officer. Let us cheerfully co-operate in this plan. Let us freely and fully discuss the papers, assist in the discharge and adjustment of business, and, above all, improve the opportunity for social intercourse, the ripening of friendships, and the extension of acquaintance.

The address was referred to a committee consisting of Drs. C. N. Johnson, James McManus, and T. T. Moore.

The president resumed the chair, and the announcements of the meetings of sections were made.

Dr. RICHARD GRADY, of Baltimore, moved the appointment of a special committee of five to consider the expediency of teaching the care of the teeth in the public schools. Referred to the Executive Council.

Adjourned to 8 P.M.

Evening Session.

At the evening session the report of Section III, Operative Dentistry, Materia Medica, and Therapeutics, was called, and the chairman, Dr. THOMAS E. WEEKS, of Minneapolis, read the report.

Dr. C. N. JOHNSON, Chicago, read a paper entitled "Inlays: their Advantages and Limitations."*

Discussion.

Dr. W. V-B. AMES, Chicago. The propriety of my selection for the opening of the discussion of this paper seems to me doubtful, as I feel that the paper has been written at this time because of the very general interest in the porcelain inlay. My only excuse for attempting the opening of this discussion is that I have had a quite extensive and varied experience with the gold inlay, almost identical in its construction, but differing in inherent possibilities. Please recognize this similarity of construction.

My opinion of the limitation of scope of the porcelain was formed long before the present craze for it was inaugurated, and coincides so closely with what has been given by Dr. Johnson that I will have very little to say on that special subject. There are no doubt many men ready to take up the championship of the porcelain inlay as soon as I yield the floor. I wish to say that I am hoping, as I have no doubt Dr. Johnson is, that our estimate of porcelain as an inlay material has been too low. Dr. Johnson says "it is with inlays, as with every other line of our work, that the real test after all is the test of extended practical experience, and no amount of preconceived opinion can have weight against this kind of evidence." I trust that the strength and adaptability of porcelain may be found adequate in a larger number of cases than some have been inclined to suppose.

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*This paper appears in full at page 867, current issue.

As to the comparative strength of high- and low-fusing porcelain, it has been demonstrated that low-fusing porcelain has surprising strength when fused under favorable conditions. For example, a button made at one fusion. It has also been *my* experience that the same porcelain or semi-glass will not have that same texture if fused in successive layers, the initial layer being seriously damaged by successive heatings. This does not come to pass in the usual process of building an inlay with materials requiring a higher heat for fusion. As to the possibility of getting translucency and satisfactory tinting, I believe the real porcelain to be immeasurably superior to the semi-glass.

Experience shows that the cement feature has been underestimated. As a result of experience with inlays the teaching in regard to the reliability of oxyphosphates at the cervical margin must be modified. In conversation, in society papers and discussions, and in text-books we have gotten the statement that oxyphosphates cannot be relied upon at the cervical margin of a deep cavity, and that gutta-percha must be used there for safety. Success with inlays has demonstrated that we must look for some other explanation of such failure of oxyphosphates than the effect of environment, since this is the portion of the periphery of an inlay about which we need to have least concern after proper preparation of the cavity. This is unmistakably so simply because of this part of the periphery being removed from the waste of mastication, etc. I cannot refrain from touching on the difference between washing and solution of cement. The essayist possibly unintentionally refers to this in one sentence as solution, and in another as washing. A really reliable cement I have for a long time claimed does not dissolve, but simply washes; and that seems to be demonstrated with inlays. The cement remains intact at the cervical margin, and washes at the masticating surface in proportion to its subjection to attrition of liquids and solids. If there were a solution there would be no cessation of the waste just below the margin of inlay and enamel, such as is spoken of by the essayist. It might be said that the cement *is* dissolved to an extent when it is damaged to a slight depth by being subjected to moisture before setting sufficiently, as in this condition some of the acid is drawn to a greater or lesser depth and the cement rendered less able to withstand attrition to that extent.

As an enthusiast on the subject of gold inlays, I can begin to differ slightly with the essayist, though at the same time I am very much gratified to hear from such an authority an opinion founded on observation so favorable to the practicability of this method. It seems that the gold inlay is in a fair way to have its inning, notwithstanding a remark during the session of Section III this afternoon, that it should be relegated to the waste-basket. I regret the absence this evening of Dr. C. L. Alexander, of Charlotte, N. C., who obtains such beautiful and practical results with what he terms cast fillings. His descriptions of the process published in the DENTAL COSMOS are probably familiar to many of you.

I began in 1889 to make use of the gold inlay for the repair of bicuspids and molars in which there had been serious loss of tissue, and for which the *dernier ressort* of crowning was not called for. From a conservative use of the process I soon became an enthusiast, and the test of time has seemed to warrant it. It has been to me an extremely satisfactory intermediary operation between the small, easily made gold filling and the badly broken crown unmistakably needing excision. I more and more desire to avoid the offset of the band beneath the gingiva. The gold inlay can be constructed and cemented without the application of the dam, which recommends it especially in the multitude of cavities extending far beneath the gum line.

The feasibility of protecting frail walls, at the same time protecting the cement joint by beveling freely and carrying the gold over the bevel is, it might be said, the vital principle of the process. Ability to burnish up to the last addition and then burnish the edge of the finished inlay is worthy of consideration. The impracticability of extending porcelain in thin edges is many times against its use. This limitation is not so much because of the occlusion coming directly upon these thin extensions, as they are generally removed from the point of real contact, but because the frailty of such an edge precludes the use of cement of such consistence as should be used, and as can be used with the gold inlay or one of porcelain having no attenuated edges.

My confidence in this operation and the integrity of a proper cement properly used is such that I have been rapidly losing any cunning I may have ever possessed in the working of foil and the crystalline forms of gold, so I of course recognize the fact that I strain a point occasionally in deciding upon an inlay, just as Dr. Johnson, for instance, would be inclined to the packing of foil in cases in which I would irrevocably insist that an inlay would best answer all needs.

Dr. E. T. DARBY. I do not rise to discuss the paper, but rather to indorse it. Dr. Johnson's paper was so thoroughly good in every particular that I think even the most extravagant admirer of and enthusiast for porcelain inlays could hardly gainsay anything that he said. While he says porcelain inlays have their limitations, and every one here will agree with him, I think some enthusiasts for porcelain inlays would say that they have no limitations. I think if you were to put that question to Dr. Jenkins, of Dresden, to his associates in practice, or to Dr. Head, of Philadelphia, they would say that porcelain inlays have next to no limitations, and I say that because I know that these gentlemen employ porcelain inlays in almost every instance where a filling of any kind could be inserted. I make that statement guardedly. I say they use them almost anywhere where any filling could be inserted.

It requires an immense amount of practice and great skill to employ porcelain in the way in which they employ it, and I have seen instances in the practice of Dr. Jenkins where I was puzzled to know how he succeeded in putting inlays in the positions in which he did. In my own judgment porcelain inlays have their limitations, and Dr. Johnson has not exceeded the statement of those limitations in his paper.

There are many places where I employ porcelain. For instance, I employ these inlays in the cases that Dr. Johnson has mentioned, on perhaps one-third of the labial surface nearest the gum or gingival margin. I think there is the most appropriate place for inlays. I also agree with what Dr. Johnson has said about the necessity of nice matching of shades and tints. There is nothing that requires greater care or more prolonged experience than matching shades in porcelain. And just in proportion as porcelains fuse at a low temperature, just in that proportion it is difficult to match shades. Porcelain when fused at a higher temperature than the porcelain represented in the sample will have some of the coloring matter burned out of it, and the result will be a shade which does not match what you are trying to match. Just in proportion as porcelains fuse at a high temperature, just in that proportion is it easier to match shades and tints.

As to the employment of porcelain inlays on approximal surfaces of the posterior teeth, the bicuspids and molars, they have not been useful in my hands, and yet Dr. Jenkins and Dr. Head successfully make use of them on many of these approximal surfaces where they have by previous separation restored the contour of the approximal surfaces, and they have made operations that have been lasting and beautiful. I cannot do it. That is, I cannot carry out my ideals in porcelain as I can carry them out in other materials.

Now, a word in regard to the gold inlays. I remember very well when gold inlays were first suggested. I believe to Dr. Bing, of Paris, belongs the credit of having first introduced gold inlays. In 1876, during the Centennial Exhibition, he came into my office and asked to go into my laboratory, saying, "I will show you something new." He then asked for some scraps of fine gold, which he put onto a piece of charcoal and melted into a globule; and then taking a hammer and laying the gold on the anvil he struck it into a thin disk. He then asked for a molar which had been extracted, which had a large cavity on the occlusal surface. I gave him one. Shaping it up with a corundum wheel, he then soldered onto the under surface of the disk a little loop of the gold that he had roughly shaped to the occlusal surface. He said, "Give me some gutta-percha." I did it. He warmed it, pressed it into position, held it there a short time, then dipped it in water and burnished it down to the margins. I do not think he consumed over ten or fifteen minutes in the whole operation, and the result was really beautiful; and I know it would have been serviceable. I know it would have been serviceable because I have made a great many of those operations, both upon the occlusal and approximal surfaces, since then. Many of them have been in use for ten, fifteen, or twenty years, possibly since the Centennial year, and are doing good service to-day. That was the first I knew of gold inlays.

I know this method differs from the method suggested by Dr. Johnson and Dr. Ames, but it is a method that will save teeth.

When Dr. Johnson was speaking of the durability or non-durability of the cements, the question arose in my mind whether gutta-percha in this instance would not serve a better purpose, and whether the gutta-percha, by being pressed between the inlay and the tooth itself, would not make a more lasting medium between the inlay and the tooth.

Dr. F. N. Brown, Chicago. Something over ten years ago I was an advocate of inlays. At that time I experimented a good deal with them, making them out of such bodies as we then had, because, of course, the newer low-fusing bodies were not then understood. The inlays were made from pieces of porcelain teeth ground to fit the cavity, and with gold adapted to the cavity in various ways. This gives us a record of something over ten years, and I can say that a large proportion of those teeth were afterward filled, some of them with alloy, and some of them with gold; and, so far as I know, they are in good, serviceable condition yet, whereas the inlay only preserves the teeth for a comparatively short number of years. A good many of those inlays that I happen to know about at the present time are still in the mouths of the patients, are doing good service, and are entirely satisfactory; but they are so simply for the reason that they happen to be in the mouths of patients who will have them constantly looked after, who will go to a dentist frequently, and when the line of demarkation between the inlay and the tooth becomes too noticeable and it is evident that the cement is washing away, as Dr. Ames would perhaps have me say, they will have that line attended to. It is possible, without the inlay being a failure, of course, to work a little liquid cement in there, or, better still, work a little gutta-percha in there, rubbing it down with a warm instrument, and in that way prolonging the usefulness of the inlay.

The reason why I finally became dissatisfied with inlays was not because they could not be made to last, but because in a large proportion of the cases I got a less sightly appearance. The cosmetic effect was less perfect than I think it would have been with any other material that would have made a definite contrast, that would have shown once for all that it was a filling of some kind and not a patch or imitation.

Perhaps the best inlays I ever succeeded in making were those in which I was not so particular to have a perfect line between the enamel and the porcelain, and where I undertook with a very fine instrument to make a line of gold around that inlay, and on such surfaces as were inaccessible line the inlay with amalgam. Such inlays as that are there now, and I expect always will be. Wherever an inlay can be placed in a tooth the pulp of which has been destroyed, and it is possible to get a pin to go into that root, use gutta-percha always and forever, and I am satisfied you will never regret it.

Dr. OTTOLENGUI. When Dr. Ames was on the floor he alluded to the fact that in the discussion before Section III this afternoon it was suggested that gold inlays should be placed in the waste-basket. I beg to confess that I was the delinquent. The question was asked me at the time by Dr. Johnson, when the question of placing inlays in one section or another was being discussed. Dr. Johnson asked me the question, if inlays of porcelain should be considered in Section I, where would I put inlays of gold, and I said in the waste-basket. I did not at the time know that Dr. Johnson was to read a paper on the subject, and before Dr. Ames mentioned the matter here this evening I had quietly come down the aisle and apologized to Dr. Johnson and been acquitted of any seeming discourtesy. But after all my apologies I must say that on the whole I still think the waste-basket to be a very good place for gold inlays, and I believe that a good many of them will get there. When I spoke in that manner I was not really considering the actual usefulness or disusefulness, if I may use such a word, of gold inlays, but I blurted out the remark in a thoughtless way; and back of it there was in my mind this idea, that the gold inlay has always seemed to me a sort of short cut for an unskillful man to do what his skillful neighbor does with a gold filling, and it has been my opinion that the final test of the best dentists in our profession in the past, and the test which should be continued in the future, should be the skill and ability with which they make lasting operations with gold foil.

I have in a measure been somewhat responsible for the esthetic craze now passing over the profession, but back of it all there is a consciousness in my mind that there is the possibility that as we become more esthetic we are becoming less practical and less useful to our patients.

I could not but indorse Dr. Johnson's paper, because of its very conservativeness. He told us that nearly every place in the mouth was a bad place for an inlay, and that in the places where you could put an inlay it would be better if you would put a gold filling there. Well, I am perfectly willing to admit that.

I want to say a word about some remarks that were made concerning porcelain inlays. Of course I admit, and I do not mean it as an expression of modesty, but merely the relation of a fact, that I am not skillful in the matter of porcelain inlay work. Nevertheless, it has seemed strange to me to hear the remark made so often, which has been reiterated by Dr. Johnson and Dr. Darby, that the ideal place for an inlay is in the labial gingival locality. To my mind, just in proportion as you get depth to your cavity, you will get the possibility of having a durable inlay. Depth is a difficult thing to procure in the gingival labial surface. The most disheartening failures which I have had have been exactly in that locality, and to my mind, if we consider the matter from the esthetic standpoint, the most useful place, the most practical place, for porcelain inlay work is in moderately small cavities in the approximal surfaces of the six front teeth. To my mind, the very nicest thing I have done with porcelain for any patient was for a young woman whose teeth were disfigured by little fillings of gold in the approximal surfaces, so that at a little distance her teeth looked just as much decayed as though they had not been filled, with these little perfectly regular semicircular cuts in them. It is possible that the dentist had brought his cavities too far to the front, but I had to take them as I found them; and the young woman was complaining of the appearance and asking for porcelain. They were small cavities, and I put in small porcelain inlays. I am sure that I could have refilled them with gold in much less than one-half the time, but the result far exceeded anything obtainable in any other part of the mouth, and they seem to be more durable there than anywhere else.

Another thing is, why should we consider porcelain only from the standpoint of esthetics, when it has another exceedingly useful property in a place where we constantly say to our patients, "I do not think it would be wise to put a metal filling in this cavity"? I mean in those cavities where the pulp is so nearly approached that we do not like to place gold over it, and where it is not sufficiently approached that we feel authorized to go in and destroy the vitality of the pulp. In many of these cavities porcelain can be placed with the certainty that you are doing the best that can be done for your patient, because you are putting in a piece of porcelain with a thin layer of cement as an alternative for a cement filling, not as an alternative for a gold filling. It is in localities of that kind that porcelain is useful. And then, again, it is useful in the buccal cavities of upper and lower molars; those exceedingly sensitive cavities that go down to the gum line, where it would be manifestly a very great hardship, both to the operator and to the patient, to put in a perfect gold filling where we usually resort to amalgam. I have seen Dr. Jenkins make the most beautiful porcelain fillings with the certainty that there would be no suffering from thermal changes, because the intervening tissue was overlaid with porcelain instead of metal.

Before I sit down I should like to say a word to Dr. Darby about the matching of shades with the low-fusing porcelain. His experience has been mine also, that we may match a tooth with a little piece of porcelain as it comes to us, and that we may not be able to get that shade when we come to bake the powder; and it has been finally driven into my consciousness that I did not make those shades properly, that some other potentiality entered, and I have a set of shades myself, and I bake them true to those colors, with greater success.

Dr. JOHNSON. The doctor made the statement that he had had more failures in inlay work in those cavities which involve the gingival third of the labial surfaces. I should like to ask him in what particular those fillings failed, whether by displacement or recurrence of decay.

Dr. OTTOLENGUI. I have never seen the recurrence of decay around any porcelain filling.

Dr. C. S. BUTLER. I shall not undertake to discuss the question of porcelain inlays, but I should like to say a word in regard to gold inlays; not perhaps so much because of my personal experience with them, though I have used them considerably for the last ten or twelve years, and very satisfactorily, but more because of what I have seen of the effect and durability of gold inlays which came from the hand of another operator. Something like twelve years or more ago there came into my office as a patient a young lady who in former years had been the patient of Dr. Straw, of Newburgh, N. Y., whom all New York men will remember, and whose memory we all revere. In the mouth of this patient he had placed three gold inlays, following the method described by Dr. Darby, except that he had anchored them with cement instead of with gutta-percha. These cases have been under my observation constantly during all these years, and I think they have been tested under the most trying circumstances, as during the last seven years the lady has been an extreme invalid, a partial paralytic, and has taken on a great amount of flesh, being unable to assist herself to any great extent. Her entire physical organism has deteriorated; her teeth particularly so. During all this time the cavities that were filled with gold and amalgam in similar localities by Dr. Straw and other good dentists since that time have failed, while the gold inlays have remained perfect to this day. I have often felt that that was one of the severest tests of the value of the gold inlay.

In my own practice I have not used it extensively, but I use it in particular cases. My method—I do not like to use the word "method," but my practice—has been to use the inlay the first half or two-thirds of the approximal cavity, never bringing it to the grinding-surface of the tooth, anchoring with cement, and then filling the remainder of the cavity with gold, burnishing it over the inlay, leaving the foil filling as the masticating surface of the tooth. And I have found these operations to be admirable, especially where the walls of the bicuspids particularly, or of the molars, were frail, as the cement strengthens the wall; and burnishing up to the wall from without holds the inlay admirably, and the foil filling for the masticating surface, being less easily displaced than the inlay if it were brought to the grinding-surface would be, is very satisfactory.

Dr. AMES. I do not think Dr. Ottolengui can have a solid gold inlay in mind when he talks of their impracticability. If he has, then I would like to ask of him, or any other gentleman holding similar views, how under the sun there can be found any justification for the insertion of a porcelain inlay?

Dr. CRAWFORD. In answer to Dr. Ames's question, I would like to say a word as to the practical value of this method. While I have enjoyed the papers very much this evening, there are two things that we seem to have lost sight of. One is the inability of the dental profession to bake porcelain in small quantities. We have never done it, and we never will do it successfully. Here and there we find a genius who will do it, but the most of the profession never have succeeded in doing it, and never will.

The other point of practical importance is the attachment of the inlay to the tooth, whether it be gold or porcelain. That has not been particularly touched upon. Gold has the advantage in this particular. You can accomplish the attachment of gold, or form attachments in the cavities better than you can with porcelain, and back of the cuspid teeth, above and below, a properly constructed gold inlay is superior to any man's porcelain. Upon the front surfaces of the incisor teeth, or the cuspid teeth, or any of the teeth in front of the mouth, where you can get a porcelain inlay, and have the porcelain properly supported, that is the ideal way of doing it, if the porcelain is properly baked and in large quantities. Where gentlemen like Dr. Ames and Dr. Ottolengui have the means of baking porcelain properly, I grant you they can produce an occasional result that is very satisfactory. Dr. Jenkins does very beautiful looking work, but I have never been able to do that, and I have never seen very many who could. I am never going to use a great number of them until I can do it. I like the gold inlay very much in the back part of the mouth.

The integrity of the cement is another point that is lost sight of. I do not know very much about people who live in other countries, but a very large per cent. of Americans have tartar on their teeth; and we all know that tartar has an affinity for the cement, and a large number of the best successes are attributable to the sealing up of the imperfect joint by the accumulation of tartar. That is true, whether you believe it or not. That is one grand adjunct to the therapeutic value of these things in the back part of the mouth. A good article of cement beats gutta-percha all to death. Next to amalgam, gutta-percha is the poorest thing ever introduced into dental surgery.

Dr. OTTOLENGUI. Dr. Ames asked me a question, and I will just take a moment to answer it. The doctor asked me if gold inlays are to go to the waste-basket, what about porcelain ones? I should like to inform the doctor that I have a special waste-basket in which I put porcelain inlays. Those are the porcelain inlays which are imperfect, and therefore not fit to be set. That is perhaps one reason why I make so much money with porcelain inlays, because sometimes I make two or three that I put in the waste-basket before I make one that I put in a tooth. Now, I do not believe that all gentlemen who make gold inlays as imperfectly as I sometimes do put them in the waste-basket. I think they put them in the mouth. That is my answer. I think there are a few men who have made a few gold inlays that are doing good service, and that they can do it again, but I do not think it is a good practice for the National Dental Association to advise young men to try. They had better learn to fill the teeth with gold, like the rest of us.

Dr. CROUSE. The last speaker voiced my sentiments on this subject in the last remark. I went to the meeting of the National Association last year expecting to find something that I had always missed. My experience with porcelain inlays runs back quite a long way. It has not been extensive, because I can generally make a better looking filling, and a more durable filling, and with less labor, by using platinized gold in the front of the mouth than I can with porcelain. As to the porcelain fillings which I saw at Niagara Falls last year, I wish to say that if I cannot double discount them with the different shades of platinized gold I will quit the practice of dentistry. There was nothing there that, in my opinion, approximated platinized gold, and I saw the porcelain operations at the clinics at Niagara Falls.

As to the question of gold inlays, what do you make a gold inlay for? To save the force on the tooth, as I understand. The proposition is that it takes longer to make a gold inlay than to make a gold foil filling of the same size. I think that is correct. Now, by taking non-cohesive gold in the form of cylinders you can make a more durable filling, and quite as large or larger than with all cohesive gold; a filling that will be more durable than any gold or porcelain inlay. I make that proposition, and I am willing to accept a challenge on it. The use of non-cohesive gold in the form of cylinders is becoming almost a lost art, but I think it is one of the most useful things in the practice of dentistry.

Dr. RHEIN. While agreeing very heartily with the paper of Dr. Johnson in regard to the use and limitation of porcelain work, I want to say a word in reference to the latter part of the paper, and the one that has been receiving most discussion, and that is the question of gold inlays. It has been my good or bad fortune to have seen a rather considerable number of gold inlays that it was necessary to replace with gold fillings, for the very reason that Dr. Johnson stated in his paper; that is, the method of construction, the beveling of the edges so that the gold overlaps the enamel surface around the cervical border, leaving a foreign substance, something more than nature had originally placed there, which left a ledge, as it were, for the *débris* to hide in. Now, these particular inlays that I have reference to have come directly from the hands of men who can do the very best operations in contouring teeth with gold. And I want to say further that the only good gold inlay that it has ever been my fortune to see—I refer now to the restoration of one of the posterior approximal portions of one of the posterior teeth—is where a well-inserted gold filling had become loosened on account of a lack of sufficient anchorage, and was replaced by a good cement. I have had such an inlay as this under observation now for about five years, and it has been unattended by any defects; and I attribute that entirely to the fact that it perfectly restored the lost portion of the tooth at the cervical border, a principle that is not followed in the burnishing of an inlay around the cervical border of the tooth, such as I have seen. I do not doubt that gold inlays may be placed in a great many mouths and remain there for years without any inconvenience or loss or trouble to the teeth, but we know also that in a very large number of mouths the most imperfect filling will remain in this condition. And, as far as clinical experience goes, I most strongly emphasize the position taken by Drs. Ottolengui and Crouse, and the other gentlemen who have taken that position, that it is very detrimental to the education of the dentist of the future to advocate such a method as this, which is so liable to be ill-used and misused.

although it is possible to preserve certain classes of teeth in this manner. In my own estimation there is no comparison between a well-inserted gold filling and an inlay of this character, for durability. It does not necessarily mean any lessening in work to the operator when the gross amount of the labor is considered, and the discomfort to the patient is a question entirely between the capability of the operator and the strength of the patient. At the same time I should like also to emphasize what Dr. Crouse said of the superior value of platinized gold in the anterior part of the mouth, especially in the incisal edges, in preference to any form of porcelain that can be used in these particular positions.

Dr. JOHNSON. Just one word, and that relates to a slight mistake that Dr. Rhein has made in his understanding of my paper. When I referred to overlapping of margins or beveling of margins, those who particularly noticed the paper will recall that I specially mentioned toward the occlusal surfaces. If we leave any overhang whatever in the gingival portion under the gum, we know that the irritation that he has referred to will occur. I simply want to call attention to that particular feature of the paper. In speaking of beveling the margin, I restricted it particularly to those regions near the occlusal surfaces.

I want also to say that in referring to gold inlays I meant solid gold inlays, and not shell inlays under which is a large mass of cement or gutta-percha. I do not believe that we can depend on that particular kind of inlay.

And I should like to emphasize the fact also that I do not want to seem to be too great an advocate of inlays. I did not think I should ever have to say one word in this organization in defense of inlays. I was the only member of the society last year that said anything against inlays. Notwithstanding I agree with Dr. Crouse and Dr. Ottolengui, and the others who have spoken of the superiority of gold fillings, I still believe that there are cases where we can successfully and advisedly use gold inlays.

(To be continued.)

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

(Continued from page 799.)

Symposium on Dental Education (Continued).

COURSE OF STUDY.

BY DR. W. A. EVANS, CHICAGO, ILL.

IN preparing this paper I have had before me the time-cards of several of the very best dental schools that this country has produced. Some of these have rather nominal university connection; some have considerable university control; some have close medical school affiliations. Such figures as I use are formed by averaging figures derived from these schedules.

The question is not one of condemnation of the dental course as now existing. Lest there be some misunderstanding in this regard, I hasten to say that in my opinion the average dental course is better than the average medical course. I will even state the matter more strongly. In my opinion, for the average dental student, any good dental course is better than is the best medical course for the average medical student.

Unquestionably the past demand has been, and the present demand is, for a dentist who can meet the ordinary questions that arise in the course of dentistry without any special reference to the more abstruse or remote problems, or the more remote bearings of ordinary problems. This demand is changing, and the dentist of the future who succeeds will be somewhat differently educated.

If I might institute a comparison between the medical and dental courses, I would call attention to this fact: A small proportion of the medical graduates go through hospitals, thus learning the handling of patients, the every-day care for medical details, the bearing of responsibility. Every dental student has two years of practical ordinary work. In this he learns the handling of patients, the every-day care of dental details, the doing of things, and the bearing of responsibility.

This matter of responsibility is no small item. The medical dispensary in efficiency is not *to be ranked* with *the dental* infirmary.

When all of this has been said, the fact remains that we do not make of the dentist as broad a man as is possible.

How are we to increase not only his breadth, but his desires for greater breadth? The second clause is more important than the first.

In averaging these time-cards I find that in the first year in prosthetic technics, prosthetic dentistry, and other purely dental subjects an average of sixteen hours a week are spent. In anatomy, physiology, chemistry, histology, bacteriology, and materia medica twenty-one hours are spent. If we figure on Bayard Holmes's basis of two hours of study preparatory for a recitation, and one hour of recitation, constituting an hour of study, then the twenty-one hours devoted to foundation work would increase perceptibly. Nevertheless, when we compare the number of hours of preparatory study required by the dental student with the requirements for the medical student, we find that this first year does not require as much of work. It would be advisable to make several changes. One would be to add a competent course in physics. In only one school do I find a course in physics. This is usually given in connection with chemistry. Some make it a nominal entrance requirement. The importance of this subject is so great in dentistry that it requires special consideration. It should not be left to the hazard of an entrance requirement. Not only that, but dental physics should be taught.

I find but little reference to embryology and comparative anatomy. Yet when you finally solve the disease known as pyorrhea, you will have to thank the dog. There are any number of dental diseases, apparently impregnable, whose flanks can be turned through the lower animals.

I do not know whether I would decrease that average of technics in the first year or not, but the number of hours devoted to the broader subjects can be increased. I find one school scheduling infirmary in its first year. This is wise. It seems desirable to put the student in the infirmary in the beginning of his work. A proper plan would be to assign each first-year man to a third-year man, and have him serve the third-year man in the capacity of an assistant. He would do no work; he would watch the senior, wait on him, dry cavities, etc. The advantage of this would be twofold. It would give the senior confidence and self-control. It would save his energies; it would increase his observation and his mental acuteness. The first-year man would gain in many ways. Most important of all would be the fact that it would give him an idea as to the dental bearings of anatomy, histology, chemistry, etc. The declaration of Mr. Flannagan, of Texas, to wit, "What are we here for?" has been somewhat lost sight of. While we must ever broaden, we must always remember that the object of it all is to make a dentist a broad, learned, growing, developing dentist, but always a dentist.

Coming to the second, or junior, year, infirmary gets an average of eight hours a week on the assignment schedule. In a few the infirmary is conditional. The purely dental subjects get an average of sixteen hours. This includes prosthetic technics, orthodontia technics, prosthetic dentistry, operative dentistry, instrumentology, oral surgery, and orthodontia. Other subjects, such as anatomy, physiology, pathology, bacteriology, chemistry, and materia medica and therapeutics, get sixteen hours. My general criticism of the first year would apply with more force here. The disproportion is too great. There should be less of technical, laboratory, and didactic instruction, and more of other work. Less of the art, and more of the science of dentistry—dentistry broadly considered.

In the third year I find infirmary is an average of twenty-five hours. In my observation the student actually puts in over twenty-five hours.

To orthodontia, oral surgery, operative dentistry, prosthetic dentistry, porcelain and bridge-work, and applied pathology, eight hours are given. To other subjects about three hours are given. The criticism that I would make here is that too little study is required of the senior student. He is kept busy during the day, but the system of clinics and lectures without quizzes does not employ all of his time. This is bad; not only in that he fails to get the full advantage of what is going on around him, but it gets him out of the habit of studying while he is still in the school.

Finally, two general considerations: The dental course should be a four years' course. The criticism against lengthening the medical course does not apply here, for you keep your student far better in contact with his ultimate aim, and there is little danger of your making a scientist and ruining a practitioner. The dentists now practicing want it; the people do not oppose it. It rests with the possibility of unity in the dental faculties.

The second general point is this: Dentistry suffers whenever she is dissociated from medicine. They are not only natural allies, they are of the same body. Any effort at dissociating them tends to make of dentistry an art, and possibly a trade, rather than a science. Therefore, every possible effort must be made to hold them together. That which a young man gets in college comes in two general ways, that which he gets from lecturer and demonstrator, and that which he absorbs from his atmosphere. This last transcends the former, I believe. Believing thus, I must think the medical schools and the dental schools should be joined; that certain classes should be taught in the same section rooms; certain subjects should be covered in identically the same way; that certain aims should be common; that association between the students should be free and untrammeled. This does not mean any loss of dignity to that which is properly a specialty, but it means an added dignity from an equal position in a great sisterhood.

ON THE RELATIONS OF DENTAL AND ORAL SURGERY TO THE GENERAL FIELD OF MEDICINE AND SURGERY, AND THE TRUE PROFESSIONAL STATUS OR RANK OF THE PROPERLY EDUCATED PRACTITIONER OF DENTAL AND ORAL SURGERY.

BY N. S. DAVIS, M.D., LL.D., CHICAGO, ILL.

That "medicine, surgery, and dentistry are actually departments of a common science" very few will be disposed to deny. I say "a common science" in deference to popular custom. It would be more proper, however, to use the plural form of expression, for what is generally styled medical science is really an aggregation of many sciences and their cultivation with direct reference to the prevention and alleviation of human suffering. Therefore, the student of medicine in its general sense is emphatically a student of nature.

Medicine, surgery, and dentistry are all based upon chemistry, anatomy, physiology, pathology, and materia medica, consequently these five branches of medical study are fundamental, and no man can do full justice practically to the most limited specialty without a thorough knowledge of them all.

There is still another aspect of this subject that is worthy of a moment of thought. From the nature of the laws that govern mental processes, exclusive practical attention to any one department of a general subject tends to contract and bias the mind by giving undue relative importance to one series of facts while neglecting another series of equal importance. An evil of much greater magnitude, however, consists in the strong tendency to specialism to encourage incompleteness of professional education. During a connection with medical teaching for sixteen (now more than fifty) years, I have rarely found a student who on his final examination proved himself ignorant of some important department without his alleging that he did not intend to practice that particular department, and consequently had paid less attention to it. Indeed, incompleteness of education leading to the adoption of partial and restricted views, and the universal tendency to neglect whatever is not intended to be turned directly to practical pecuniary advantage, constitute the foundation of a very large part of the evil that exists in the professions of our country.

The dentist who restricts his work entirely to the processes of filling teeth may possibly acquire greater skill in that particular work (provided he has enough of it to do) than he would if, in addition, he extracted teeth, fitted artificial teeth, treated diseases of the mouth, etc.

The surgeon who restricts himself entirely to the more important and delicate operations on the eye, or the ear, or the blood-vessels may acquire greater dexterity in performing these operations than if he attended to the whole field of operative surgery. But the rule applies to only such operative procedures as are essentially mechanical, and cannot be extended to the treatment of the diseases of particular organs without causing much more evil than good, simply because there is no living structure or organ in the body so isolated that its functions, both in health and disease, are neither influenced by other organs nor by the general functions of the tissue metabolism.

Doubtless ere this you are ready to ask if I oppose all specialties in the medical profession. I answer, By no means. There is a natural basis on which a limited number of specialties can be founded with great advantage, and which, indeed, develop themselves by the natural and inevitable course of circumstances. For instance, the diseased deformities and defects of the dental organs, involving no immediate changes to life and requiring for the treatment of many of them special mechanical manipulations, naturally and almost necessarily constitute a special department of surgery. A department, indeed, that should be regarded as equal in importance and dignity, and consequently requiring equal education with every other branch of the profession. Those conditions of the eye requiring delicate and dexterous operations are also most of them chronic, and allow the patient time to seek and obtain the services of men who have acquired more than ordinary skill in the performance of such operations. The same is true of those conditions requiring the most dangerous and difficult surgical operations upon other parts of the body, such as lithotomy, ovariotomy, the ligating of large and deep-seated arteries for aneurism, etc.

Here it is eminently proper that in all large cities where the required opportunities are afforded men should devote special attention to such departments. But this can never justify or excuse any class of medical men for contenting themselves with only a partial medical education. Obviously, there is no more propriety in having a separate profession of dentistry than there is of ophthalmology, or neurology, or gynecology. The same standard of preliminary education and the same curriculum of medical studies covering the four years' course should be required of all who propose to practice in any of the departments or specialties of medicine and surgery. All should be required to pass the same examining boards, be designated by the same title, M.D., and be governed by the same rules, both ethical and legal. Let there be in every medical college faculty a professor of dental and oral pathology and practice, on the same basis that you have a professor of ophthalmology, neurology, or gynecology.

The instructions by an efficient occupant of such a chair are needed as an important aid to every practitioner of medicine, whether his field of practice is in the city or the country. For, if he never attempts to treat a defective tooth or a diseased gum, he should be able to recognize the existence of such conditions and promptly direct the sufferers to those who would treat them. And for those members of the college class who intend to make dentistry their special field of practice, it would only be necessary to supplement their general course by from six to twelve months of post-graduate mechanical and clinical dental work, as most of those who choose other specialties do after their graduation. By thus unifying all departments of medical and surgical practice, including dentistry, under the same educational standards and the same title of Doctor of Medicine, the influence of the profession would be increased. Better economy could be practiced, inasmuch as it would dispense with the necessity for providing separate laboratories and professorships for teaching dental students the fundamental branches of medical science, as well as separate state boards of examiners, and some embarrassments pertaining to professional rank and position would be removed.

At the first annual meeting of the section in connection with the American Medical Association, 1882, one of its members presented an interesting paper on the importance of having dental practitioners for both the army and navy service, and the need of such has become so apparent since the war with Spain that serious propositions have been made in government circles to have at least one dental and oral surgeon appointed for every one thousand enlisted men in the military service. But if they are not fully educated and graduated M.D.'s, can they rank as regular members of the army and navy medical corps? Or will they rank simply as artisans? These same questions were raised recently on a proposition to appoint a dentist on the staff of one of the London hospitals. But another important embarrassment arises every time a dentist educated in an exclusively dental college desires to become a practitioner of medicine. In his application to a medical college he always insists that he ought to be graduated M.D. by simply attending the senior year of the medical college, when not one out of twenty of such applicants have been half educated in either anatomy, physiology, pathology, or materia medica and therapeutics, and it is practically impossible for him to make up these fundamental deficiencies while attending the practical and clinical instruction of a senior year.

This, however, brings us back face to face with the most radical evil that pervades all departments of professional education in our country,—namely, the dominant spirit of commercialism that is ever ready to sacrifice mental discipline, breadth of knowledge, and soundness of judgment for whatever leads most directly to the chance of earning the dollar.

SOME THOUGHTS ON TEACHING MATERIA MEDICA AND THERAPEUTICS, EMPHASIZING OBJECT TEACHING.

BY A. H. PECK, M.D., D.D.S., CHICAGO, ILL.

One of the first and most important questions to be considered in a paper of this character is just how far should we, as teachers of dental students, carry our pupils in this great field,—materia medica and therapeutics. Are we justified in being content to teach them just enough to enable them to treat locally, reasonably well and with a respectable degree of success, the various pathological conditions about the mouth? Or should it be our aim to so instruct them that they will at once be able to recognize and intelligently prescribe for the various systemic disorders that are constantly aggravating the local pathological manifestations? and, indeed, many of which latter are only indexes of the systemic disorders. My answer is most emphatically in favor of the latter course. Please do not understand from this declaration that I would have the dental student subjected to as thorough, complete course in materia medica as is required of the medical student. However, I am strongly inclined to the belief that this phase of the question should only be qualified by the unfortunate condition invariably imposed upon us,—namely, lack of time.

Nothing grieves me more than to hear, as we frequently do from the older members of the profession, the leaders, those to whom we are accustomed to look for guidance and inspiration, this sentiment, —that it is a mere waste of time to teach the dental student more materia medica than is necessary to enable him to treat reasonably well the local manifestations of disease in the mouth.

The very logic of medicine lies in one's ability to recognize the primary action of drugs upon the various organs, and through the great systems of the body the secondary action upon other organs, and in this manner having an indirect but important bearing upon the local pathological manifestations. Thus is one enabled to note the parallelisms existing between the action of drugs and the pathological conditions in disease, a very fascinating study indeed.

Let it be understood, then, that we favor, first, the teaching of those drugs with which the student will come in contact daily in his practice, such as the antiseptics, disinfectants, germicides, escharotics, counter-irritants, and styptics.

Next in importance is a thorough knowledge of at least the standard remedies that may be indicated for the alleviation of all the systemic disorders that may in any way aggravate or affect the local diseases under treatment. Then a thorough knowledge of the circulatory stimulants and depressants, the respiratory stimulants and depressants, the nerve stimulants and depressants, is essential. The hemostatics, diluents, antiphlogistics, cannot be passed by with only a superficial consideration.

Then the most important of those agents which in any way assist to the performance of better work,—the digestive, assimilative, and eliminative organs, the last comprising the sudorifics, diuretics, and cathartics. Local and systemic antidotal treatment is of the utmost importance, and the intelligent prescribing of these medicines must never be neglected.

Two important questions now present: How much regarding these various agents shall we teach? And how best may we teach it? In answer to the first question I will say we cannot teach too much about them. It is true our students should be well grounded in the pharmacology, source, constituents, physical characteristics and properties, their physiological action (and this, too, in its broadest application), their therapeutic value (this being perhaps the most important of all), and their dosage when indicated.

An individual consideration of these agents or groups of agents, however desirable, is out of the question in the time allotted to this paper.

In answer to the second question, "How best may we teach this?" I will reply that no one rule or set of rules can be followed successfully by all. As indicated above, teachers, as well as poets, are born, not made, and each one will find it necessary to follow the guidance of his own personal capabilities and characteristics.

In my individual work I find the recitation plan of inestimable value; the source of the drugs, their physical characteristics and properties, their chemistry and dosage being almost exclusively taught after this plan. The physiological and therapeutic action of the agents is taught by lectures and by demonstration. However, ofttimes I find the recitation method peculiarly adapted to this division of the work. We should strive to make our teaching in these two phases of our work just as interesting to our students and as thorough as possible. It is of the utmost importance that we be able to select the proper drug for a certain form of disease. Blundering in this respect is inexcusable, and often results in the most serious consequences. And to understand clearly just how these agents are affecting the various organs through which they are passing on their disease-healing mission is important and necessary to an intelligent use of them.

Soon after assuming the duties of this chair in college work I became especially impressed with the many shortcomings of our various text-books. Indeed, any one who has taken the trouble to look into this question will agree with me when I say that one only has to consult another author than the one that does not suit him to find teaching to suit his own particular fancy, so at variance are the statements of the many different authors pertaining to these various questions in materia medica and therapeutics.

Their lack of harmony as to the relative potency of the various antiseptics and germicides, and their almost total lack of any consideration as to what special agent, under certain conditions of irritation, inflammation, sepsis, or otherwise, would be more desirable for use than another, especially impressed me. I consider it of the utmost importance that our students, and we practitioners, shall be possessed of knowledge that is accurate regarding especially the essential oils and other agents we are daily using. We should know their relative value or potency as antiseptics, disinfectants, and germicides. When we select an agent to place, perchance, in the root-canal of a tooth, it is important that we be familiar with its relative ability to perform the work required of it. Not only this, but I also consider it equally important that we should know the action of these drugs on the soft tissue with which they come in contact. The antiseptics and germicides are poisonous to the vegetable cell. They are used in our work to inhibit the development of and to destroy the germs of disease. Many of them are, as well, poisonous to the animal cell. No one will question the great value of being able to select an agent for a certain case that will destroy the germs present, render the parts aseptic, and at the same time will remain harmless in contact with the soft tissue. Ofttimes it is desirable that an antiseptic or a germicide be used that is also stimulating to the diseased tissues, causing them to yield more readily to the healing influence of the drug. Again, it may be desirable to use one of these agents that imparts a depressing effect upon the soft parts. How are we to make these selections with judgment and certainty without an accurate knowledge of their action when confined in contact with soft tissue?

That I might have something definite to work upon, that I could feel that when I went before my class and made certain statements in this connection, I could verify those statements by actual demonstration, I have adopted the following plan of teaching these phases of the subject:

During each term a thorough and complete series of tests is made in the bacteriological laboratory and before the class, to determine the exact relative value of these agents as antiseptics and germicides. Also an exhaustive series of experiments has been conducted on soft tissue, both animal and human, while in both a pathological and normal state, to determine which are irritating, stimulating, or depressing, that we may make our selections for special use with wisdom and certainty.

I believe the same individual who teaches therapeutics should teach special pathology. The two fields are so closely co-related it is impossible for a teacher to give a comprehensive course of instruction in the one without trespassing more or less freely on the other. Since special pathology has been assigned me in connection with therapeutics, I find I am able to present the work in a much more interesting manner than I otherwise could do. The students unquestionably gain a clearer and more satisfactory understanding of the various diseased conditions, their pathology, and therapeutics than was formerly possible.

Throughout this brief paper I have hinted at the value of object teaching. I wish now to emphasize this method as strongly as may be. No one can deny that more thorough and satisfactory work can be done by object teaching and actual demonstration, where the nature of the work admits of it, than is possible through the medium of lectures. Suppose it is our purpose to teach the class the effect of a certain drug upon the various organisms, and for purposes of illustration we will consider a cardiac and respiratory stimulant. We go before the class, and in language that is simple, plain, and cannot be misunderstood tell them the manner in which the drug affects the circulatory system and the organs of respiration. That they act directly upon the nerve-centers in the medulla and through the medium of the vaso-motor system of nerves stimulate the muscles of the heart to greater activity, thus increasing the force and frequency of the pulse; and that they act, through the medium of the circulation of the blood, upon the respiratory organs, stimulating them to greater activity, thus deepening and lengthening the inhalations. Again, a suitable animal is provided, placed upon the table in appropriate manner, is anesthetized that it shall not suffer pain, then with the knife and appropriate apparatus these internal organs under consideration are exposed to actual view; the students see them in operation performing their natural functions. Now the stimulating agents are administered, and the students see their effect upon these organs. In turn they are taken to the laboratory and required to make the demonstration themselves. Do I hear any one ask which method of teaching will make the profounder impression on the student's mind? Personally, I can see no comparison. The simple pleasing word-picture as presented by the "successful" lecturer makes but a passing impression on the mind of the average student. This cannot be called knowledge, only transient information. The actual demonstration which he has made and observed makes a deep and lasting impression on his mind, and imparts to him knowledge that is permanent.

We do not even think of instructing students in anatomy purely by lecturing to them on the subject. The institution of learning to-day that would advocate this would be laughed to scorn. No; we take the student to the dissecting room and there teach the subject by actual demonstration. What would the teaching of chemistry amount to without the laboratory? And the same in regard to the teaching of metallurgy. It is unnecessary for me to follow this line of illustration further.

It seems to me the statement that object teaching in all branches and departments of our college curriculum which admit of it is the only truly effective method to be employed. We must work into this manner of teaching more and more if we desire to make the best returns for the favor and patronage of our students. I confidently hope and expect in the near future to see a general move along this line in college work.

THE PRACTICAL VALUE OF A MEDICAL EDUCATION TO THE STUDENT IN DENTISTRY.

BY WARREN BROWN HILL, M.D., MILWAUKEE, WIS.

There is too broad a gap existing between the practice of medicine and dentistry; a field of practice uncultivated by either physician or dentist; one which cannot be reached by either so long as present conditions remain. The physician fails to recognize the mouth as an orifice in which neural irritations productive of remote manifestations are developed, but rather treats it as a cavity for dentists to work in. The infection of the alimentary tract is a matter of great interest to the practitioner of medicine, but the oral cavity, with its abundance of microbes and its deep recesses for their propagation, has been abandoned by him to the dentist.

The patient is referred to the dentist with the expectation that he will assume the full responsibility of the care of the mouth, a responsibility which he may not assume if his knowledge of medicine is not sufficient to trace from cause to effect, and from effect back to cause again, any of the pathologic conditions to be found there. In our present condition of practice a large percentage of the diseases of oral origin go unrecognized by dentist and physician alike; the physician unskilled in locating abnormal conditions of the mouth, the dentist uninterested in the remote manifestations in the body of the patient. That humanity should unnecessarily suffer from the maladjustment of medical and dental education is a serious reflection upon the intelligence of those professions.

Medicine and dentistry should no longer be divorced. Dentistry should at once take its place as a part of the science and art of medicine, and should be practiced as a specialty. The intelligent consultation of physician and dentist would remedy the evil, but no consultation can be intelligent until those consulting have a common ground upon which to stand,—medical education.

The ideal dentist should have become familiar with pathologic conditions not only in the mouth, but the body generally. In fact, he should have so comprehensive a knowledge of practical medicine that he might diagnose disease with sufficient accuracy to refer his work to its proper field in medicine, and then by his consultation and co-operation contribute materially to the welfare of his patient. But ideals are not easily attained. Still, we may encourage the co-operation of physicians and dentists by bringing together medical and dental students in one institution, requiring the same course of instruction for both in the fundamental branches. We may offer them the advantages of attendance upon medical and surgical clinics, and gradually weave into their course the studies of the medical curriculum best adapted to broaden their education, until finally we may evolve the ideal dentist, the peer of any specialist in medicine.

LIMITATIONS IN DENTAL EDUCATION.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

In dealing with limitations in dental education we are brought face to face with their greatest evil, divorcement of dental from medical teaching. Removal of a special department from general medicine and tuition of it along narrow lines has so narrowed teaching that even diseases of the general system which affect the mouth, jaws, and teeth are excluded. The medical profession has been content to let the dentist entirely alone. In studying systemic diseases, therefore, it has not trespassed upon the field of dentistry. The result is that study of the general diseases which affect the mouth, jaws, and teeth has been neglected. Limitations of a dental education have prevented the dentist from associating local diseases with systemic causes.

The jaws and teeth as part of the human body are influenced by the local and systemic conditions of the human organism. Narrowing our specialty to the treatment of the human tooth and ignoring the influences of the systemic diseases of the body and the local diseases which surround the jaws and teeth has resulted in great mental limitations to the dentist. Only a medical education can remove these mental limitations.

Embryonic evolution teaches that the jaws and teeth are transitory structures degenerating from year to year. They were foreordained to destruction from the very beginning. The teeth, unlike other structures of the body, obtain their size and growth before they erupt. Therefore nourishment and repair are out of the question. If decay of the teeth (which is a natural process) will not remove them, a simple process, interstitial gingivitis, and finally a still simpler process, osteomalacia, or senile absorption, will accomplish the result. In the lower vertebrates, such as the whale, shark, snakes, etc., continuous succession of teeth are produced throughout life. Osteomalacia, or senile absorption, therefore, is the outcome of the law of atavism. Nature is trying to remove the second set.

Is there not a limit to certain operations which are so enthusiastically advocated by dentists? In early races, as noticed by their skulls, and in modern nearly pure races decay of the teeth when observed always commences in the fissures of the crown and at the necks of the teeth below the enamel. These are the defective places in otherwise strong, healthy teeth. In the teeth of to-day, owing to degeneration in shape, size, and structure, and with modern methods of life, decay takes place at any locality, owing to imperfectly developed tooth-structure. Decay is more frequent and more rapid to-day than formerly, and is increasing with great rapidity. It is more rapid with some nationalities than others.

With the concentration of all the knowledge, energy, and skill that has accumulated in the dental profession, the result of its narrow teaching in the past sixty years, dentists have not been able to prevent the ravages of decay. Nor will they if they practice present methods for a millennium.

By filling the teeth the cause is not removed. Under present methods dental technique will never prevent decay.

What is needed to-day is broad education in pathology that will find the cause and remove it.

Modern methods of practice, such as gold crowns, bridge-work, producing irritation of the gums, cutting away teeth, allowing the roots to come close together (Bonwill), thus removing support and nourishment from the teeth, are fruitful sources of interstitial gingivitis.

Correcting irregularities of the teeth after the alveolar process has obtained its growth by the use of springs, ligatures, and elastics requires great skill and judgment to prevent destruction of the alveolar process.

Viewing the subject from a university standpoint, dental college teaching is in a rut,—a very deep and narrow one at that. A large percentage of the colleges ought not to exist. While the motive of many of the teachers is honorable, a large percentage of them have not the proper education to teach. Presidents and boards of regents of the universities having dental departments should reorganize these schools and place dental teaching upon as broad a foundation as other departments of science. The preliminary qualifications, entrance examinations, and length of course of study should be the same as in other departments of science. Then, and not until then, will dentistry hold the position in the community which it deserves.

SHOULD THE DENTAL STUDENT BE EDUCATED INDEPENDENTLY OF GENERAL MEDICINE?

BY GEO. V. I. BROWN, A.B., D.D.S., M.D., C.M., MILWAUKEE, WIS.

It ought to be a matter of surprise that the title of this paper should find itself called for by demand of the present state of opinion among members of the dental and medical professions, so called, yet we know that these two, which at most ought only to be recognized as distinct factions of the same professional body, are not commonly so understood. And while the current stirred by the movement of vastly increasing realization of the importance of medical science as related to the oral cavity has done much in this direction, yet there is a decided tendency to limit the dentist's field of operation, despite the very apparent need of its extension.

The colleges that have been conducted independently of medical colleges point with pride to the record of their achievements. They can and do truly say, "We have been the chief factors in making dentistry and the dentists of America the best in all the world." Grant this, and still may it not be possible that in the evolution of the educational system of a great profession the time has come for something better, for a curriculum which, embodying all that the specialization and technical training has beneficially accomplished, shall yet become so broadened as to include the scientific study that a thorough knowledge of medicine demands and which shall have become imperative in view of the requirements of an educated public?

Notwithstanding all contrary efforts, several factors are working to this end. The education of medical and dental students together, as in the departments of universities and medical schools, is perhaps first among these influences.

Time and inclination are, after all, the essential points. The former must be gained by lengthening of required periods of study before graduation, the latter an outcome of natural development stimulated by such influences as may be brought to bear upon the colleges, students, profession, and laity.

Last, but by no means least, the public, being educated through the press and otherwise, are now more and more strongly filled with the grave character of pathological oral conditions, and seek rather one who deals with such than an artisan who rivals the jeweler in his accomplishments to the exclusion of such considerations.

The plan of having a four years' medical course precede the study of dental branches is impracticable; the age of the student, after allowing for the necessary years of preliminary study, would in most instances be such as to make the matter of manual training and the acquirement of sufficient technical dexterity very difficult and uncertain, whereas, on the other hand, the more matured mind is better able to understand the science of medicine.

In this dentistry, while a special branch of medicine, just as the eye, ear, gynecology, or any other of the recognized divisions, differs from each, and the overruling of this fact must surely tend to its disadvantage; but there is no good reason why the study of medicine during the first two years cannot be supplemented by a thorough training in operative and prosthetic technics, or general anatomy by special dental anatomy, or objection to continuing practical operations in the mouths of patients under the direction of demonstrators in the college infirmary during the months between the courses, where for full uninterrupted hours of each day the student can be steadily employed in performing all the operations of dental practice in order that he may, during the winter session, devote more time to the studies of his third year in medicine without interfering with the regular requirements for dental graduation, and the following year receive a degree in medicine. Such a student, although completing the work in four years, has had seven full courses of instruction, and therefore much more practical experience and study than could be possible during the regular winter sessions alone. At the same time his study of medicine is exactly the same as though he were to be a general practitioner, and he is in all respects an equal in mental equipment.

Perhaps one of the most perfect systems for educational development that has ever been brought forward is the Froebel kindergarten. Its practical utility in developing the powers of the growing child is simply marvelous, yet its general application to public school methods for large numbers of children is undoubtedly proving itself anything but the benefit that it really ought to be. So in the matter of giving instruction in operative and prosthetic technics in our dental colleges, while the conception and value of such work in preparing the student by training the hand, the eye, and the mind to act together with a just appreciation of the requirements for operations upon the mouth and teeth, by laboratory instruction, beyond doubt mark a milestone in the progress of dental education, yet when such methods are applied to the instruction of numbers of students far greater than could be undertaken at one time where actual work upon the patient was required, and instead of bringing the individual student in closer touch with actual conditions of the mouth tends to keep him away from such conditions, and thus longer removed from the time when he shall operate upon the living subject, then, like the kindergarten under similar conditions, it ceases to be the thing of benefit that it should, and is a menace to that high development for which it was originally begun.

Unfortunately, the fact is not generally recognized professionally, socially, or otherwise that the mental and physical requirements of the practitioner of dentistry cover a wide field; even more so than the exactions for rhinology, laryngology, otology, or ophthalmology. His need of medical science is quite as great; his special part in its relation to general disease or to pathologic conditions in other parts is fully as significant as theirs. And, beside all this, he must have the eye and the subtle appreciation of cosmetic effects that the artist owns, as well as the delicacy of touch and manual dexterity of those whose occupation fits them to manipulate the delicate hairsprings of the finest watches. It is because the breadth, the scope, and the wonderful possibilities of individual and collective effort, if directed toward the development of the powers of future dental practitioners as a benefit to humanity, are not fully understood.

In the United States educational report it is noticed that dentistry is a branch of minor surgery, specialized and quite apart from medicine or even general surgery. Is the practice of dentistry more of the nature of minor surgery or the operations performed by the dentist in treatment of diseases of the mouth less grave or more fitly termed minor than the majority of those performed by practitioners of those other specialties, and is not the fitting of glasses quite as mechanical in its nature as the fitting of artificial dentures?

In parts of Europe there has long been a distinction between the dentist of limited degree and he who, through having had sufficient education, is entitled to be called doctor. The Belgian Government has in contemplation the suppression of the diploma in dentistry, with the right to practice dentistry to be conferred only upon the physician, the same as the other specialties of medicine.

While it seems altogether unlikely that America will follow the lead of European nations in regard to any matter pertaining to dentistry, the fact nevertheless remains that, having taken longer and more expensive courses in both medicine and dentistry, it is but natural that some benefits should accrue to the individual aside from his own self-consciousness in being better equipped for the practice of his chosen profession. This can only be through closer relations with the medical profession and the recognition as a member of that profession by the public generally; hence the tendency already noticed on the part of a steadily increasing number of individuals to hold aloof from purely dental conventions and interests. This condition of things is greatly to be deplored. It is just the leaven of the influence of such men that the upraising of the dental standard requires most urgently now as ever, and, above all things, the work of this section should be to bring all into the great medical fold.

The time has come, it would seem, for the dentist who would be also a surgeon to be one in fact as well as in name; to have his degree in medicine, and also that which certifies to his special training as a dentist. Or if he chooses to ignore the medical aspect of his calling, then should he, with due regard for consistency, leave out the word surgeon, and call himself Doctor of Dentistry, not Doctor of Dental Surgery or Doctor of Dental Medicine, since he elects to ignore the profession which these terms represent; but be at once and for all time simply the Doctor of Dentistry, a teacher, in other words, of the methods of filling teeth shorn of the medical, the pathological, the bacteriological, the surgical, and, in short, the entire medico-scientific aspect. The very individuals who so loudly proclaim the fact that a dentist should be distinct and separately apart from the medical profession, and freely ignore the right to recognition in that direction, would be the very first to protest against the withdrawal of all those portions of the educational and practical branches of his profession which belong by right of fact, custom, priority, and inheritance to the older profession from which they wish to separate themselves.

It seems the height of absurdity to speak of the "passing of the dental college" at a moment when the number of recent graduates eclipses all former records. Yet, just as the lengthening shadows betoken the coming sunset, so must follow, as "night the day," a restoration to medicine unconditionally of her wayward but promising child, dentistry.

Dr. WM. ERNEST WALKER, Pass Christian, Miss., offered the following suggestion for "the encouragement of higher education and original research,"—viz,—

That the Section of Stomatology of the American Medical Association take steps to acquire the power or authority, whether by charter or otherwise, by virtue of which it may be empowered to confer upon deserving individuals, regardless of sex, the degree of S.D.,—*Stomatologiæ Doctor* (Doctor of Stomatology); and in order that this degree may stimulate to higher education and original research, I would recommend that this degree be conferred strictly and only upon compliance with the following requirements:

First. That the recipient shall be of good moral character and in good professional standing.

Second. That he shall have previously acquired the degree of M.D. from an institution not conferring the degree of M.D., subsequent to 1903, upon less than the requirement of an attendance upon four sessions, of not less than seven months each, in four different years.

Third. That he shall also have taken a course upon the mouth and its associate parts.

Fourth. That he shall have made some original and meritorious contribution of especial value to stomatology.

Fifth. That this degree shall not be conferred except upon the unanimous vote in the affirmative of *all* the members present at the meeting at which this action is contemplated.

The following form of diploma was suggested by Dr. Walker as a suitable certificate:

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

To all those to whom these presents shall come, greeting.

Know ye that, by virtue of the authority vested in the Section on Stomatology of the American Medical Association, we, the members voting unanimously in the affirmative, do this day confer upon X...... Y...... Z...... M.D., the degree of S.D.—*Stomatologiæ Doctor*—in recognition of his original, meritorious, and valuable contirbutions to the sum of the scientific knowledge concerning the mouth, he having complied with the following requirements,—to wit: that no person shall receive this degree except that, *first*, he shall have previously acquired the degree of M.D.; *second*, that he shall also have taken a course upon the mouth and its associate parts; *third*, that he shall have made some original, meritorious, and valuable contribution to stomatology, and *fourth,* that it shall have been unanimously voted by the members present that the degree be conferred upon him.

Wherefore, we, the members of the section, have caused to be affixed hereunto the signatures of the acting chairman of the section, and of the three last retired chairmen, and also of the present secretary of the section; the same to be stamped with the seal of the Section on Stomatology of the American Medical Association.

(To be continued.)

MISSOURI STATE DENTAL ASSOCIATION.

THE Missouri State Dental Association elected the following officers and committees at its thirty-sixth annual meeting, Louisiana, Mo., July 10 to 13, 1900. F. F. Fletcher, St. Louis, president; W. M. Carter, Sedalia, first vice-president; F. H. Achelpohl, St. Charles, second vice-president; B. L. Thorpe, St. Louis, corresponding secretary; H. H. Sullivan, Kansas City, recording secretary; J. T. Fry, Moberly, treasurer. Committee on Ethics, A. M. Magee, Louisiana; J. F. Hull, Butler; G. H. Gibson, St. Louis. Censors, R. R. Vaughn, St. Louis; J. W. Hull, Kansas City; J. F. McWilliams, Mexico. Publication Committee, Wm. Conrad, St. Louis; W. W. Birkhead, Louisiana. Executive Committee, F. M. Fulkerson, W. M. Carter, Sedalia; J. F. Hull, Butler. Committee on International Dental Congress to be held during St. Louis World's Fair, 1903, Wm. Conrad, B. L. Thorpe, H. J. McKellops, F. F. Fletcher, A. H. Fuller, Walter M. Bartlett, W. F. Lawrenz, all of St. Louis.

Next place of meeting is Sedalia, on the first Tuesday after July 4, 1901.

DENTAL SOCIETY OF WESTERN CANADA.

THE first annual meeting of the Dental Society of Western Canada was held in Winnipeg, Manitoba, on July 20 to 23, inclusive. This new organization starts with a membership roll of thirty, while many other dentists have signified their intention of applying for membership. Those eligible for membership are practitioners between Port Arthur, Ontario, and the Rocky Mountains.

Clinics were given by Dr. Thomas E. Weeks, of Minneapolis, assisted by Dr. A. R. Owre; also by Drs. Clint, Smith, and Bush, of Winnipeg, on interesting subjects. Papers were presented and read by Drs. McInnis, of Brandon, Cowan, of Regina, and Bush, of Winnipeg.

A banquet was held at the Queen's Hotel on the evening of Friday, the 20th. On Saturday evening the members and visitors witnessed the celebration held in honor of the visit to Winnipeg of the Earl of Minto, Governor-General of Canada; and the annual Winnipeg exhibition was attended at the conclusion of the meeting on Monday.

The officers and committees elected were as follows: Dr. R. R. Dalgleish, Winnipeg, president; Dr. R. A. Harvie, Winnipeg, Dr.

Schnarr, Rat Portage, and Dr. Cowan, Regina, vice-presidents; Dr. Geo. C. Mathison, Winnipeg, secretary-treasurer. Dr. Robertson, Portage La Prairie (chairman), Dr. Dickson and Dr. Powers, Brandon, Membership and Ethics Committee; Dr. S. W. McInnis, M.P.P., Brandon (chairman), Dr. St. John and Dr. Clint, Winnipeg, Program and Dinner Committee.

The officers of the society and the chairmen of the two standing committees constitute the Executive Committee.

DENTAL SOCIETY ANNOUNCEMENTS.

ROENTGEN SOCIETY OF THE UNITED STATES.

THE Roentgen Society of the United States will meet in New York city December 13 and 14, 1900, at the Academy of Medicine. Papers have been promised by eminent men abroad as well as in this country, and a very successful scientific meeting is assured.

There will be offered advantages to the visiting members for instruction in X-ray work that cannot be had under any other conditions. It is especially desired that all hospitals using X-ray apparatus, X-ray studios, physicians, surgeons. and dentists doing X-ray work, scientific investigators, manufacturers, and dealers in X-ray apparatus of all kinds throughout the United States should at once send their names and addresses to the chairman of Committee of Arrangements, Dr. S. H. Monell, 43 East Forty-second street, New York city, N. Y., so that they may receive important notices regarding the meeting.

This society is the only one of its kind in America, is national in character, and for scientific purposes only.

Those wishing to become members or read a paper before the society may communicate with the secretary.

J. RUDIS JICINSKY, M.D., *Secretary,*
Cedar Rapids, Iowa.

NORTHEASTERN DENTAL ASSOCIATION.

THE sixth annual meeting of the Northeastern Dental Association is to be held at the Eloise in the city of Providence, R. I., October 16, 17, 18, 1900. The committee has secured the most desirable and commodious building for the meeting ever obtained for such a purpose, and strenuous efforts are being made with the most gratifying results thus far to make this meeting the best in every way ever held, at least in New England.

Prominent men of the profession have been secured for papers and clinics. The exhibits will be large, and so separated from the scientific portion of the meeting that neither will disturb the other. It is earnestly hoped that a large attendance will be present at all the sessions.

EDGAR OSGOOD KINSMAN, *Secretary,*
15 Brattle Sq., Cambridge, Mass.

VERMONT BOARD OF DENTAL EXAMINERS.

A meeting of the Vermont Board of Dental Examiners will be held at the Pavilion Hotel, Montpelier, Wednesday, October 10, at 2 o'clock P.M., for the examination of candidates to practice dentistry.

The examinations will be in writing, and include anatomy, physiology, histology, bacteriology, chemistry, metallurgy, pathology, therapeutics, surgery, materia medica, anesthesia, operative and prosthetic dentistry, together with an operation in the mouth.

Candidates must come prepared with instruments, rubber dam, and gold.

Applications, together with the fee, ten dollars, must be filed with the secretary on or before October 1.

Geo. F. Cheney, *Secretary,*
St. Johnsbury, Vt.

FIFTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

The thirty-second semi-annual meeting of the Fifth District Dental Society will be held at Syracuse, October 9 and 10, 1900. A very strong program, consisting of papers, clinics, and demonstrations, is being prepared by the Business Committee.

R. B. Redway, *Secretary.*

FIRST DISTRICT DENTAL SOCIETY OF ILLINOIS.

The eighteenth annual meeting of the First District Dental Society of Illinois will be held at Galesburg, Ill., on Tuesday and Wednesday, September 25 and 26, 1900.

Arthur G. Smith, *Secretary.*

BOARD OF DENTAL EXAMINERS OF IOWA.

The Board of Dental Examiners of Iowa will meet at Des Moines, Ia., October 23, 1900, Savery Hotel. Applicants for examination must possess a diploma from a reputable dental school.

F. A. Lewis, D.D.S., *Sec.,*
Ottumwa, Ia.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

The third annual meeting of the Southern California Dental Association will be held at Santa Barbara, Cal., October 8 and 9, 1900.

L. E. Ford, D.D.S., *Secretary,*
12 Muskegon Block, Los Angeles, Cal.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The Illinois State Board of Dental Examiners will hold the next annual meeting in Chicago, October 5 and 6, 1900. Those desiring to take the examination should notify the secretary ten days before the date of the meeting.

J. H. Smyser, *Secretary,*
70 State st., Chicago.

EDITORIAL.

THIRD INTERNATIONAL DENTAL CONGRESS.

THAT the International Dental Congress held in Paris, August 8-14, afforded an unprecedented opportunity to forward the solution of serious professional problems is evident from a brief study of its membership. Of the more than twelve hundred delegates present, fully one-half were from countries outside of France; a remarkable showing, one which evidences the world-wide interest of dentists in the advancement of their profession. At the Congress in Chicago, it may be said in passing, out of a total membership of ten hundred and seventy-four, almost nine-tenths, or nine hundred and forty-two delegates, were from the United States. Never before were so many men representing so many different systems of education and thought gathered together in conference on the status and needs of dentistry. The outcome cannot be otherwise than, at the least, a better understanding of one another's position and aims than could be gained in any other way. With the clear appreciation of diverging views which comes from personal contact, the representatives of the various systems of dental education and training can see what ground is common to all, and thus approach the consideration of differing elements in a more intelligent, more comprehending spirit. There is every reason to believe that the results of the Third International Dental Congress will be far-reaching in this direction; that it will have laid the foundation for the unification of dental professional standards.

President Godon, in his opening address, spoke of dentistry as the "most specialized, the most distinctive, and the most autonomous among the medical sciences." To this he added, "It will be the purpose of this Congress to emphasize in an indisputable way the correctness of this statement, showing the degree of development and of perfection to which odontological science and its different branches has attained at the end of the nineteenth century."

The presentation of the scientific and so-called practical phases of dentistry, while important of itself, and amply justifying the president's hope, was made vastly more so by virtue of its contributive agency to the unification of dentistry. It showed where men differed in their grasp of the scientific principles and in their solution of the problems of practice. It made each practitioner who heard it wiser, added effectively to the general distribution of dental knowledge, and so aided in the much-wished-for consummation of an universal dentistry.

As to the actual working of the Congress, it was undoubtedly a great success. The machinery of organization was well planned, well built, and worked smoothly. There was little which human foresight could provide to enhance the value of the sessions which was not in evidence. Fasciculi containing the full text of the papers to be read were issued daily or oftener, in order that those who were to discuss them, and as well those who were to hear them, might have the opportunity to familiarize themselves in advance with their contents. A very complete program was printed, and, in addition, a daily journal, notifying all changes made in the program, giving a brief account of the proceedings of the previous day, notices of the many side meetings and social functions, and such other matters of interest as might be needful for the information of members.

The opening and closing exercises were held in the Palais de Congrès, one of the Exposition buildings, in which the entire series of congresses—upward of a hundred in all—connected with the Exposition are held. The clinics were given each morning in the two dental schools, l'Ecole Dentaire de Paris and l'Ecole Odontotechnique. The general assemblies and section meetings were held in the Hotel des Sociétés Savantes. This separation of the places of meeting naturally created some little confusion among the visiting dentists, more especially among those who were unfamiliar with the French language; but the difficulty was not serious, and disappeared as the strangers learned to find their way about.

The dental profession of France, who united almost as one man in the effort to make the Congress all that the most ardent well-wishers of dentistry could hope, are to be congratulated upon the success which attended their efforts; and not less are the profession at large to be congratulated upon the magnificent interpretation of the present position of dentistry which those efforts made possible.

The DENTAL COSMOS has made arrangements for a full report of the Congress. The first instalment, a part of the first day's proceedings, will be found at page 886.

PRESIDENT SMITH'S ADDRESS.

WE ask special attention to the annual address of President B. Holly Smith at the late meeting of the National Dental Association, which appears in the report at page 896. It is full of practical, common-sense suggestions. Perhaps the most important presentation in it is its masterful consideration of the preliminary training of the dental student. It goes to the root of the matter, and presents a convincing array of reasons why the intending student of dentistry especially should begin, long before he matriculates in the dental school, the training of the senses, more especially of the motor system. He shows that such a course will not only give greater manipulative ability, but that it will strengthen the general mental faculties.

Of course, this is not the first time that the value of manual training has been urged upon the profession, but Dr. Smith's presentation of the case is so unanswerable that it ought to be read by every practicing dentist.

A MUCH-PUBLISHED "CONTRIBUTION."

In the June number of the Dental Cosmos, page 527, there appeared a paper entitled "Dental Jurisprudence," by DeLancey B. Armstrong, D.D.S., of Watertown, N. Y. It had been "read before the Union Meeting of the Fifth District Dental Society of the State of New York and Jefferson County Dental Society, April 11, 1900."

In due season a letter was received at this office from Dr. Francis M. Parker, of Los Angeles, Cal., calling attention to the fact that whereas Dr. Armstrong's paper was, to a large extent, a reproduction of passages from the late Dr. W. F. Rehfuss's comprehensive treatise on "Dental Jurisprudence," published in 1892, nowhere in the paper was there any reference to Rehfuss's work; the plain inference being that the paper was offered as an "original contribution."

With this letter as a pointer an investigation was at once instituted. This investigation established the fact that the similarity between what Rehfuss said and what Armstrong said several years later was so great as to be astonishing, if accidental; that is, if the two were independent productions by two independent minds working along the same lines. Dr. Rehfuss's book contains every idea found in Dr. Armstrong's paper, excepting the fourth and fifth and last two paragraphs, and expressed in almost identical language.

To show how closely these two great minds ran in the same channel, we reproduce Dr. Armstrong's paper in full, and by its side such portions of Dr. Rehfuss's book as it closely resembles, the references to page and paragraph in the latter being indicated to enable any one having sufficient interest in the matter to verify them:

Dr. Armstrong's Paper.	Rehfuss's "Dental Jurisprudence."
The general principles of medical jurisprudence apply equally well to the dental practitioner, but there are certain special questions which arise exclusively in dental practice.	Preface, p. vii, second paragraph. It is true that the general principles of medical jurisprudence apply equally as well to the dental practitioner, but there are certain special questions which arise exclusively in dental practice, undoubtedly creating a field for a distinct and separate jurisprudence for dentistry.
Owing to the advance made in dental science, embracing the discovery of many new operations and methods of treatment, increased responsibilities rest upon the dental surgeon, the neglect of which might involve him in litigation, and the knowledge thereof may at some period in his professional career avert a calamity of a serious nature.	Preface, p. vii, fourth paragraph. Owing to the wonderful advancement within late years of the dental sciences embracing the discovery of many new operations and methods of treatment, increased responsibilities are accredited to the dental surgeon, the neglect of which might involve him in litigation, and the knowledge thereof may at some period in his professional career avoid a calamity of a serious nature.
Dental jurisprudence may be defined as the science which teaches every branch of dentistry to the purposes of the law, hence its limitations on the one hand are the requirements of the law, and on the other the whole range of dental knowledge, anatomy, physiology, therapeutics, materia medica, chemistry, operative and prosthetic dentistry, and oral surgery.	Page 9, first paragraph. Dental jurisprudence may be defined as that science which teaches the application of every branch of dentistry to the purposes of the law, hence its limits on the one hand are the requirements of the law, and on the other the whole range of dental knowledge: anatomy, physiology, therapeutics, materia medica, chemistry, operative and prosthetic dentistry, etc.
When we begin our studentship we look forward with yearning to the time when we shall have acquired sufficient knowledge and experience to be vested with the degree of Doctor of Dental Surgery. Let us inquire what legal protection is afforded to the dentist by the degree D.D.S. What are the limitations of the practice of dentistry, and what is the legal right of the dentist to administer remedies systemically?	
In considering the legal protection afforded to the dentist by the degree D.D.S., two important topics—"the legal right of the dental practitioner to perform any and all operations within the limitations or domain of dentistry," and "the legal right to administer remedies systemically"—are presented for conclusive legal interpretation and discussion.	Page 33 *et seq.* In considering the legal protection afforded the dentist by the degree of D.D.S., the two important subjects—"the legal right of the dental practitioner to perform any and all operations within the limitations or domain of dentistry," and "the legal right to administer remedies systemically,"—that have provoked much discussion, and, seemingly, are yet undecided, are presented for conclusive legal interpretation and decision.
Legal Limits of the Dental Domain.—	In discussing these questions, it

In discussing these questions it is of first importance to describe the "limitations of the practice of dentistry," or, in other words, what may properly be considered as included in the professional duties of the dentist. Undoubtedly the care of the teeth when sound, the treatment of their deformities when unsound and unhealthy, and the adaptation of substitutes for them when by age, accident, or disease they are lost. It also includes the extraction and filling of the teeth, and other operations upon them, their alveolar processes, and in some cases upon the adjacent bones; transplantation, replantation, and implantation of the teeth; the treatment of the diseases of the teeth, gums, and antrum, surgically, medicinally, or by both. These latter operations mark the limit which separates dentistry from oral surgery. He must be competent to perform any operation, treat any disease or pathological condition pertaining to the dental organs, and adopt and practice such systemic treatments as are promulgated by the body of the profession.

A prominent dentist erroneously asserted that M.D. is the only degree that can protect the dentist in case of serious results following surgical operations, and that the law will not find him blameless who without this degree essays operations from which evil results follow. This statement is fallacious. That a dentist is licensed to perform any and all operations within the domain of dental surgery there can be no dispute, providing, of course, that he complies with all the laws and enactments regulating the practice of dentistry in the country, state, or county within which he resides. He is expected to render to his patient the best services and treatment which his ability will allow. The law expects and demands that he be possessed of an average amount of skill and knowledge of his profession; if he lacks that, or neglects to use it judiciously in the treatment of a case or in a surgical operation, he is liable for malpractice should serious results follow any operation he may perform.

Like other scientific professions, dentistry is progressive. Its field of operations has become extended within late years, and operations which in former years were not per-

is of first importance to describe the "limitations of the practice of dentistry," or, in other words, what may properly be considered as included in the professional duties of the dentist? Undoubtedly, the care of the teeth when sound, the treatment of their deformities when unsound and unhealthy, and the adaptation of substitutes for them when by age, accident, or disease they are lost. It also includes the extraction and filling of the teeth, and other operations upon them, their alveolar processes, and, in some cases, upon the adjacent bones; transplantation, replantation, and implantation of the teeth; the treatment of the diseases of the teeth, gums, antrum,—surgically, medicinally, or by both. These latter operations mark the limit which separates dentistry and oral surgery. He must be competent to perform any operation, treat any disease or pathological condition pertaining to the dental organs, and adopt and practice such systemic treatments as are promulgated by the body of the profession.

A prominent dentist erroneously asserted that M.D. is the only degree that can protect the dentist, even in serious results following surgical operations. The law will not find him blameless who essays operations from which evil results follow, without this degree. This statement is mere fallacy. That a dentist is licensed to perform any and all operations within the domain of dental surgery, there can be no dispute, providing, of course, he complies with all the laws and enactments regulating the practice of dentistry in the country, state, or county within which he resides. He is expected to render his patient the best services and treatment his ability will allow. The law expects and demands that he be possessed of an average amount of skill and knowledge of his profession; if he lacks that, or neglects to use it judicially in the treatment of a case, or in a surgical operation, he is liable for malpractice, if serious results follow any operation he may perform.

Like other scientific professions, dentistry is progressive; naturally, its field of operations has become extended within late years, and operations that, in former years, missible are now perfectly legitimate. So, also, with the medical profession. Many operations are legitimately performed which formerly would not have been countenanced by the law had serious results followed and had there been a suit at law.

Experimenting with New Methods.—A dentist cannot experiment with his patients to their injury without liability to damages for the same, but a dentist in performing an operation or treating a case may have a new method of treatment or operation suggest itself to him. It may be only a deviation from or improvement upon an old method. However, if he has good reasons, and could prove that it possessed advantages over the old method, he is privileged to practice the same; or when such operations become popular and accepted by the body of the profession as practical and beneficial to mankind, then, and then only, is he, according to the accepted views of the courts, licensed to perform them. In certain operations the circumstances may vary; each case may present novel features, and of course it is not to be expected that every one will be successful. However, the dentist will not be held liable for adverse results if he can prove that he pursued the course of treatment or method of operation advocated by others in cases of the same character, and that he used an ordinary degree of skill and knowledge. He can vary the treatment and method adopted by others if he can give sufficient good reasons for doing so, and prove to the satisfaction of the court that they are founded on good judgment and authority.

Day by day new operations are discovered, legitimized, and added to the science of dentistry. Those that are adopted and adjudged by the body of the profession to be necessary for the benefit and advancement of the health of mankind the dentist is expected to practice, at least this is what the community and his patients expect of him,—viz, that he should give the best ser-

were not allowable, are now perfectly legitimate. So, also, with the medical profession. Many operations are performed, perfectly legitimate, that formerly would not have been countenanced by the law, if serious results had followed, and it had been made a case at law. However, a dentist cannot experiment with his patients to their injury without liability to damages for the same. This doctrine was decided in the cases Potter *v.* Wiggins, 51, Me., 594, and Slater *v.* Barker, 2 Wils., 359, and is quoted elsewhere in this work.

But, a dentist, in performing an operation or treating a case, whatever its nature, may have a new method of treatment or operation suggest itself to him. It may be only a deviation from or improvement of the old method. However, if he has good reasons, and could prove that it possessed advantages over the old method, he is privileged to practice the same, or, when such operations become popular and accepted by the body of the profession as practical and beneficial to mankind, then, and then only, is he, according to the accepted views of the courts, licensed to perform them. Naturally, in certain operations, the circumstances may vary; each case may present different features, and, of course, it is not to be expected that every one will be successful. However, the physician or dentist will not be held liable for adverse results, if he can prove that he pursued the course of treatment or method of operating advocated by others in cases of the same nature, and used an ordinary degree of skill and knowledge. He can vary the treatment and method adopted by others, if he can give sufficient good reasons for doing so, and prove to the satisfaction of the court that they are founded on good judgment and authority.

As stated, day by day, new operations are discovered, legitimized, and added to the science of dentistry. Those that are adopted and adjudged by the body of the profession necessary for the benefit and advancement of the health of mankind, the dentist is expected to practice, at least that is what the community and his patients expect of him,—viz, that he gives the best services and the benefit of any new discoveries in science. In court the expert testimony, the lawyers, and jury would determine whether such knowledge could be required of one who possessed an average degree of skill and knowledge of his profession, where negligence and lack of this skill and knowledge was the charge against the dentist.

May Dentists Administer Anesthetics?—Some dentists doubt their legal right to administer anesthetics. These views are erroneous, as it is expected of the dentist, where he can mitigate or lessen pain, that he should do so; and, if the operation demands it, he should administer an anesthetic. We find that the skill demanded of him is held to include all the known rules which the experience of the profession has discovered and advocated. He must thoroughly understand all of the practical details of the operation which the court would hold to constitute only ordinary skill. If he can prove that he thoroughly understands the modes of administration of anesthetics, precautions to be observed, etc., he is not liable for adverse results, provided he applied his knowledge to the case at issue.

A prominent dentist has made the following erroneous statement: "If a dentist should administer an anesthetic and the patient should die, what is the result? The physician can give a death certificate, but the dentist cannot." This is absurd. If a patient dies while under the effects of an anesthetic during an operation the physician must notify the coroner, exactly as a dentist would be required to do, and cannot give a death certificate in such cases. If he cannot prove that he used the requisite skill he would be held liable, just as a dentist would be under similar circumstances.

Administration of Internal Remedies.—Some dentists doubt their legal right to treat cases by internal medication. This belief should be corrected. Dentists must prescribe medicines in certain cases, as, for example, in the treatment of carious teeth, or any pathological conditions of the dental organs of a patient in an anemic condition, due to improper food and nourishment. Where is the well-educated dentist

vices, and the benefit of any new discovery in science. In court, the expert testimony, the lawyers and jury would determine if such knowledge was required of one who possessed an average degree of skill and knowledge of his profession, where negligence and want of this skill and knowledge was the charge against the dentist.

Certain dentists question their legal right to administer anesthetics. These views are erroneous, as it is expected of the dentist, that where in an operation he can mitigate or lessen the pain, he shall do so, and if the operation demands it, he shall administer an anesthetic. Referring to "Suits for Injuries from Anesthetics" (sec. 27), we find that the skill demanded of him is held to include all the known rules the experience and wisdom of the profession have discovered and advocated. He must thoroughly understand all of the practical details of the operation, which the court would hold to constitute only ordinary skill. If he can prove that he thoroughly understands the modes of administration of anesthetics, precautions to be observed, etc., he is not liable for adverse results, if he applied his knowledge to the case at issue.

A prominent dentist made the following erroneous statement: "If a dentist should administer an anesthetic, and the patient should die, what is the result? The physician can give a death certificate, but the dentist cannot." This is absurd. If the patient dies while under the effects of an anesthetic during an operation, the physician must notify the coroner just the same as a dentist would have to do, and cannot give a death certificate in such cases. If he cannot prove that he used the requisite skill, as stated above, he would be held liable the same as a dentist would be under similar circumstances.

Some dentists doubt their legal right to treat cases by internal medication. This belief should be corrected, as it all depends upon their ability. Dentists must prescribe medicines in certain cases, for instance: In the treatment of carious teeth, or any pathological conditions of the dental organs of a patient in an anemic condition, due to improper food and nourishment; where is the well-educated dentist who does not recognize the fact that in order to insure success he must prescribe tonics, perhaps a change of diet, and treat his patient constitutionally, producing a tonicity of the general system? In the South the dentists prescribe quinin for the cure of malarial neuralgia. In trigeminal neuralgia, in most cases, relief can only be obtained by constitutional treatment, and in the severe forms of alveolar abscesses internal medication is absolutely necessary.

If it be granted that the dentist is licensed to treat every disease and perform all operations in dentistry, how can he be successful if at the very outset he is handicapped by being prohibited from prescribing such remedies as are beneficial, and which the case indicates and requires? If it be admitted that we are licensed to treat all such cases, where can the responsibility rest if adverse results occur in cases where internal treatments have been used, providing a legitimate course of treatment was pursued in the case?

A dentist should certainly be held responsible for neglect if he does not use internal treatment in cases which positively require it, and where failure can be attributed to this negligence or want of skill and knowledge. Of course, it is not expected that he prescribe remedies unless he is thoroughly conversant with their effects and the proper mode of administering them.

Dental Malpractice Defined.—Dental malpractice may be defined as bad or unskilled practice on the part of a dental surgeon whereby an unskillful operation is performed, the health of the patient injured, or his life destroyed by the improper and careless administration of medicines or anesthetics. In the performance of all dental operations the dentist is required to use at least ordinary skill. He must adopt the means and apply the skill and treatment advocated by the highest and best authorities in his profession. Should the practitioner inform his patient of his lack of skill, or should he learn from other means, the patient cannot complain of that which he knew did not exist.

who does not recognize the fact that in order to ensure success in his operations and treatment he must prescribe tonics, perhaps a change of diet, and treat his patient constitutionally, producing a tonicite on the general system. In the South, the dentists prescribe quinin for the cure of malarial neuralgia, without the use of instruments. In trigeminal neuralgia, in most cases, relief can only be obtained by constitutional treatment, also in the severe forms of alveolar abscesses, internal medication is absolutely necessary.

If it be granted that the dentist is licensed to treat every disease and perform all operations in dentistry, how can he be successful, if at the very outset he is handicapped by his inability to prescribe such remedies as are beneficial, and which the case indicates and requires? If it be admitted, and it cannot be otherwise, that we are licensed to treat all such cases, where can the responsibility rest if adverse results occur in cases where internal treatments have been used, providing a legitimate course of treatment was pursued in the case?

A dentist certainly should be held responsible for neglect if he does not use internal treatment in cases that positively require it, and where failure can be attributed to this negligence or want of skill and knowledge. Of course, it is not expected that he prescribe remedies, unless he is thoroughly conversant with their effects, and the proper mode of administering them, etc.

Page 37, Sec. 11.

Dental malpractice may be defined as bad or unskilled practice in a dental surgeon, whereby an unskillful operation is performed, the health of the patient injured or his life destroyed by the improper and careless administration of medicines or anesthetics.

Page 39, first paragraph under Sec. 14.

In the performance of all dental operations, the dentist is bound and required to use at least ordinary skill. He must adopt the means and apply the skill and treatments advocated by the highest and best authorities in his profession.

Page 40, second paragraph.

Should the practitioner inform his patient of his want of skill or knowl-

	edge, or the patient by some other means learn the fact, the latter cannot complain of that which he knew did not exist.
Again, a dentist is not bound to use the highest degree of skill, but he must use reasonable skill and diligence; and in judging of this, regard must be had to the recent advances and improvements.	Page 41, first paragraph under Sec. 15. Again, a dentist is not bound to use the highest degree of skill, but he must use reasonable skill and diligence, and in judging of this, regard must be had to the advance in medical and surgical knowledge and improvements of recent times.
A dentist cannot experiment with his patients, and must exercise judgment and care in undertaking to perform a new operation or to use a new instrument. Should injury result from experimentation with new instruments and methods, he can be held liable in damages for the same.	Page 43, first two paragraphs under Sec. 16. A dentist must exercise judgment and care in undertaking to perform a new operation or use a new instrument. "Should injury result from experimentation with his patient, he can be held liable in damages for the same." (Patten *v.* Wiggins, 51 Me., 594.)
Higher Responsibility of Specialists.—The law recognizes a difference existing between the relative skill and knowledge of a specialist and a non-specialist. A dentist announcing himself to the public as a specialist in any branch of dentistry, whether in bridge or crown operations, diseases of the mouth, administration of nitrous oxid gas, orthodontia, or operative dentistry, is by law supposed and expected to possess more than the ordinary skill or knowledge of the subject required of a general practitioner. He is expected to possess and practically use the highest skill and knowledge his profession has attained on the subject.	Page 47, first three paragraphs under Sec. 20. The law recognizes a difference existing between the relative skill and knowledge of a specialist and non-specialist. A dentist holding himself out to the public as a specialist in any branch of dentistry, whether in bridge or crown operations, diseases of the mouth, administration of nitrous oxid gas, or operative dentistry, is by law supposed and expected to possess more than the ordinary skill or knowledge of the subject required of a general practitioner. He is expected to possess and practically use the highest skill and knowledge his profession has attained on the subject.
Legal Status of Fees.—In regard to services and the compensation for the same, I find that a dentist cannot be compelled to render service to a patient when requested, but when once he has taken a case he must continue his services, unless dismissed, until other attendance can be obtained, even if the services be gratuitous. A dentist has a right to charge for time lost by an unfilled appointment. The decision of the court will depend upon the circumstances and evidence produced. A dentist has the right to retain a set of teeth made or repaired by him, as security for reasonable charges. This lien is	Page 99, Sec. 31. A dental practitioner cannot, legally, be compelled to render professional services to a patient when requested; . . . but when once he has undertaken a case, he must continue his services, unless he is dismissed, or until reasonable time has been given to procure other attendance, even if the services are gratuitous. Page 104, first sentence under Sec. 32. The right of a dentist to charge for time not actually spent in operating upon a patient, yet set aside for him by appointment, is a question which has resulted in numerous litigations.

waived by parting with possession or agreeing to give credit for them.	Page 105, last paragraph under Sec. 32. In these cases the decision of the court will rest upon the circumstances and evidence produced.
	Page 107, third paragraph. A dentist may hold a set of artificial teeth made or repaired by him as a security for his reasonable charges; this lien he will waive by parting with possession, or by entering into any contract inconsistent with its continuance, as, for instance, when he agrees to give credit for a stipulated time. (Edwards or Bailmerts, §§ 420-425.)
Legally, no limit is placed on the fee a dentist may charge for his services. A practitioner may charge more or less, using his discretion, estimating the value of the service which he renders. The value of the services of all professional men is not alike. An eminent practitioner, with an established reputation and long experience, can reasonably demand a larger fee for the same service than a less experienced practitioner.	Page 106, second paragraph. Legally, no limitation is placed on the fees recoverable by a dentist other than they be reasonable and in proportion to the amount of services rendered. "Within this rule, a practitioner may charge more or less, using his discretion in estimating the value of the services he renders: but the presumption is that similar charges are made for similar services." (Garrison's Amer. Sys. Dent., Vol. III., 950.) Again, the value of the services of all professional men are not alike. An eminent practitioner, with an established reputation and long experience, can reasonably demand a larger fee than a less experienced practitioner, for the same service, as it is presumed that the party employed him with a knowledge of this circumstance.—Willcox's Medical Profession, III.
The variety of circumstances, as the nature of the disease, the amount of knowledge and skill required in the treatment, the circumstances under which the services were given, the difficulties and expense attending them, and the responsibility devolving upon him, regulate the value of the services of a professional man.	Page 107, second paragraph. The variety of circumstances—as the nature of the disease, the amount of knowledge and skill required in the treatment, the circumstances under which the services were rendered, the difficulties and expenses attending them, and the responsibilities devolving upon him—regulate the value of the services of a professional man.
I think there is a tendency among dentists to belittle their services, saying to themselves that the fee charged is sufficient, and depriving themselves of the extra remuneration that might be gained if they held a higher estimate of the value of their own work. In conclusion, I would say that the law affords us greater protection, greater latitude for operations, and greater respect for our work, from a pecuniary standpoint, than	

is generally supposed, and we ourselves are to blame if dentistry does not always stand as one of the noblest and most respected professions.

We have called this a "much-published 'contribution.'" In the course of the investigation before referred to we turned up the fact that this same "contribution" had been read before the Jefferson Dental Society at Clayton, June 13, 1896, and had been published as so read in the *Items of Interest* for February, 1897, page 102. Its statements and arguments have thus been published in Rehfuss's book, before two dental societies, and in two dental magazines. The publication above makes six times (or shall we say seven?) that this "contribution" has been given to the dental public or portions of it. We are prepared to believe that no other part of Dr. Rehfuss's book has had so wide a circulation. May we, in view of the facts here narrated, suggest that if anybody else has a desire to write an "original" paper out of this very admirable book he will pass by the portions which we reproduce? They contain valuable ideas for the dentist no doubt, but we submit that they have been made so prominent a part of the dental literary diet the past three or four years that a change is necessary to prevent the dental literary stomach from rejecting its food. At any rate, the DENTAL COSMOS, in behalf of its suffering readers, gives formal notice that its pages are closed to any further publication of this part of Dr. Rehfuss's book as original matter.

BIBLIOGRAPHICAL.

TRAITE D'ANATOMIE HUMAINE. Par P. POIRIER et A. CHARPY.

This remarkable treatise, which, with the exception of two volumes, is now completed, consists of six volumes, comprising thus far nine fasciculi covering the whole field of human anatomy.

The authorship is composite, and each section has been confided to the care of an eminent specialist of acknowledged ability in his particular department.

The first fasciculus of the fourth volume, treating of the digestive apparatus, contains an elaborate section dealing with the teeth prepared by Dr. Oscar Amoedo. It is refreshing to find the descriptive study of the human teeth so elaborately and accurately set forth in a general work on human anatomy; most works on this subject deal with the dental organs as though they were of minor importance, and not directly connected with the rest of the organism, beside which much of the matter on the teeth presented by the general anatomist is erroneous.

The growth of all departments of medical science, including anatomy, has been such that adequate treatment can only be attained in treatises having composite authorship, after the manner of the work under consideration, and the selection of a trained specialist to prepare the section dealing with dental anatomy has in this case produced a result far beyond that reached in any other work on human anatomy of which we have knowledge.

Especial commendation must be given to the character of the illustrations, which are artistically done and are true to nature; a vast improvement on many of the monstrosities supposed to delineate the teeth and dental structures in standard text-books on anatomy.

We commend both the method and the result attained in the present work to the makers of future text-books on anatomy as a model upon which to improve their works from the dental standpoint.

THE CAUSE AND PREVENTION OF DECAY IN TEETH. By J. SIM WALLACE, M.D., B.Sc., L.D.S., R.C.S. London, J. & A. Churchill, 1900.

This is a republication in book form of a series of articles published by the author in the *Journal of the British Dental Association.*

The topics covered are (1) dental caries and its causation in general, (2) influence of heredity, (3) civilization, (4) causes of irregularity of teeth, (5) effects of irregularity, (6) recession of the gums, (7) food-stuffs, (8) prevention of decay in teeth.

The work is an interesting biological study, dealing largely with nutrition, and defines the normal nutritive process as affecting the resistive power of the organism and the expression of malnutrition in and about the teeth.

While not by any means exhaustive in its character, the work is highly suggestive and full of much interesting information, showing the marks of originality and of careful and thoughtful research.

CLINICA Y OPERATORIA DENTISTICA. Por M. CH. GODON, Director of the Dental School of Paris. Madrid, J. Palacios, 1900.

This, as its title indicates, is a translation into Spanish of the well-known work of M. Godon, and needs no further comment other than to state that the translation is well done, and the mechanical reproduction highly creditable.

NOTES ON THE TREATMENT OF IRREGULARITIES IN POSITION OF THE TEETH. By J. F. COLYER, L.R.C.P., M.R.C.S., L.D.S., dental surgeon to the Dental Hospital of London, etc. London, The Dental Mfg. Co., Ltd., 1900.

As stated in the preface, the subject-matter of this work formed the basis of a course of lectures given to the dental students of the Charing Cross Hospital, and it bears evidence of the fact that it is a book intended for students. It is systematic in its treatment, logical in the development of the subject, and exceedingly lucid and readable in its style.

Orthodontia is just emerging from the stage of empiricism and developing into a scientific specialty of dentistry. The orderly arrangement of the several topics in Mr. Colyer's work does much to bring order out of the chaotic mass of material which has been gathered together relating to the general question of irregularities of the teeth. Undoubtedly many individual workers will find here and there reasons to differ with the author upon matters of theory or of method; yet, on the whole, we know of no more methodical and conservative book which could be placed in the hands of the dental student as a safe introduction to the intelligent treatment of irregularities of the teeth than the work under consideration.

A MANUAL OF PERSONAL HYGIENE. Edited by WALTER L. PYLE, A.M., M.D. Philadelphia, W. B. Saunders & Co., 1900.

This manual is prepared in collaboration with a number of contributors, who have furnished special articles for the work. It covers the hygiene of the digestive apparatus, of the skin and its appendages, the vocal and respiratory apparatus, the ear, the eye, the brain and nervous system, and closes with a section upon physical exercise.

Perhaps no department of medicine is of greater importance than that which deals with prophylaxis, and a work upon personal hygiene is most timely, as attention is being more and more drawn to the importance of intelligent individual care in order to maintain and improve the bodily health. The present work is written in popular style, and is presumably intended for popular use.

We heartily commend the manual for its special value in all of the departments with which it deals, with the exception of that portion dealing with the hygiene of the mouth, which is disposed of in eight small pages. Inadequately as this important phase of the question is treated, the section is not without interest as demonstrating what is probably the range of knowledge possessed by the average medical practitioner on that subject. It would have added much to the practical value of the work to have secured the services of an intelligent dentist to present this subject as it should be done.

With the exception of the defect noted, the work is valuable, and should perform an important mission in the education of the public with respect to the means which should be employed to prevent attacks of disease.

OBITUARY.

DR. CHAS. HENRY RICHTER.

DIED, May 3, 1900, near Wind Lake, Racine county, Wis., from an accidental cause, CHARLES HENRY RICHTER, D.D.S., in his thirty-eighth year.

Dr. Richter was born January 30, 1863. In 1879 he became his father's pupil in dentistry, and a few years later,—in 1886,—he was graduated from the Dental Department of the University of Pennsylvania. He began practice in Milwaukee the same year. He was a member of the Milwaukee Odontological Society, and was a favorite among his professional brethren, being especially characterized by a generous readiness to impart any knowledge he might acquire. His death was due to the accidental discharge of his gun while climbing a barbed wire fence.

Dr. Richter was unmarried. He leaves a mother, four brothers, and a sister.

DR. LOUIS H. FISK.

DIED, May 8, 1900, at Saranac Lake, N. Y., from tuberculosis, LOUIS H. FISK, D.D.S., in his twenty-eighth year.

Louis H. Fisk, the son of Dr. H. J. Fisk, was born October 15, 1872, at Rowe, Mass. During his early infancy the family removed to Connecticut. In 1890 he began his dental pupilage in his father's office at Hartford. In 1895 he was graduated from the Pennsylvania College of Dental Surgery. His name was also enrolled in the membership of the Connecticut State Dental Association.

Upon his graduation, after a few months' delay due to ill health, he took up professional work at Hartford, and during the next three years acquired an excellent practice. Symptoms of failing health developing, thenceforward he spent the winters at Saranac Lake and the summers at Rowe. With the idea of practicing at Saranac Lake he passed the New York State Board examination, but the realization of his design was frustrated by his feeble condition.

A man of bright, genial disposition, and one who had always a pleasant word, Dr. Fisk made warm friends wherever he went. On the occasion of the funeral, at Hartford, the popular esteem and sympathy were abundantly testified to, and the floral tributes were almost innumerable. Revs. E. S. Terry and R. Eldredge officiated, a male quartet rendering appropriate selections. The bearers included two dental classmates of the deceased,—viz, Dr. R. W. Hunter, of Greenfield, Mass., and Dr. Henry McAdams, of Worcester, Mass.

Dr. Fisk married, June 19, 1895, Miss Mary Louise Lyman, of Hartford, who survives him.

DR. FRANK H. KENNEDY.

Died, May 28, 1900, at Springfield, Mass., Frank H. Kennedy, D.D.S., in his twenty-third year.

Dr. Kennedy was born August 23, 1877, at West Brookfield, Mass. While he was quite young his parents moved to Springfield. After passing through the high school course there he took up the study of dentistry. In June, 1899, he was graduated from the University of Pennsylvania Dental Department. In August he entered upon practice at Springfield, where he enjoyed a steadily increasing practice. His death was the unhappy sequel of surgical operations undertaken for the relief of appendicitis.

Dr. Kennedy was a member of the Massachusetts State Dental Society, and was also enrolled in the Delta Sigma Delta fraternity. Throughout his school and college life he was noted as a good all-round athlete. He was unmarried, and the only surviving close relative is his mother.

DR. FRANKLIN M. PEVEY.

Died, May 1, 1900, at Wilton, N. H., from interstitial nephritis with complications, Dr. Franklin M. Pevey, in his sixty-eighth year.

Dr. Pevey was born in Bennington, N. H., May 2, 1833. His grandfather fought in the Revolutionary War and afterward settled at Wilton. His parents removed to New York state while he was an infant, but at eighteen years of age he returned to Wilton to complete his scholastic studies. This purpose effected, he went to Clinton, Mass., to become initiated in dentistry by a pupilage spent with his brother, Dr. Amos A. Pevey, and in 1853 he was established independently in Vermont. He afterward practiced also in Newburyport and surrounding towns.

Dr. Pevey was a genial man, his conversation being generally full of pleasantries, but he was also well equipped with a shrewd and penetrating judgment. He remained in active practice until the present year, and throughout his professional career had little reason to complain of lack of pecuniary reward for his labors. He had invested considerably of late years in real estate, owning property in Wilton and several other towns. He leaves a widow,—formerly Miss Nancy B. Sheldon, whom he married December 24, 1858. Three brothers and two sisters also survive him.

DR. ARCHIBALD MILLER.

Died, March 16, 1900, at his home, Hartford, Conn., from tuberculosis, Dr. Archibald Miller, in his twenty-sixth year.

Dr. Miller was born at Hartford, June 16, 1874, his father being a native of Scotland. He studied in the Hartford High School. From a lad he had always been popular; he was, in fact, of a most pleasant type of character. While qualifying himself for the professional career in which he planned to spend his days, he was compelled by ill health to relinquish study. This occurred while he was in the senior year of the dental course at the Harvard Dental School. Returning to Hartford he entered the office of Dr. Bryant, with whom he remained until recently. Dr. Miller was a member of the Congregational Church. He was an only child, and much sympathy is felt for the parents in their great sorrow.

DR. JOHN WESLEY AUSTIN.

DIED, May 4, 1900, at Florence, Col., from pneumonia, JOHN WESLEY AUSTIN, D.D.S., in his twenty-ninth year.

Dr. Austin was born at Granville, Mo., November 23, 1871. He became a student of the dental department of the Marion-Sims College of Medicine, from which he was graduated in 1897 with honors. He was alive to the interests of professional progress, and was enrolled as a member both of the Missouri State Dental Association and of the St. Louis Dental Society.

Dr. Austin, who was in weak health, was making a short stay in Colorado, when he caught cold, which developed into pneumonia, to which he finally succumbed. A feature of sad interest is found in the fact that he was about to be married. The remains were brought to his home in Paris, Mo., where the interment took place. Among the relatives gathered at the funeral, besides the father of the deceased, were his brothers, Dr. Jas. Austin and Charles Austin, of St. Louis, and his cousin, M. B. Austin, M.D., of Brunswick, Mo.

DR. THOS. R. BROWN.

DIED, March 5, 1900, at his home in Philadelphia, Pa., from apoplexy, Dr. THOMAS R. BROWN, aged seventy-four years.

Dr. Brown was born at Hereford, Berks county, Pa., in 1826. His first occupation was that of a weaver, but aspiring to a career in a more liberal vocation he entered the office of Dr. Barnes, of Allentown, in 1847, as a pupil in dentistry, and a little later practiced, first at Copley, Pa., and then at Mauch Chunk. In 1855 or 1856 he removed to Philadelphia, where he resided for more than forty years. He enjoyed a lucrative practice in this city, and was known as one especially skilled as an anesthetist. In more recent years, however, he had become almost withdrawn from dentistry into commercial life. In early manhood, it seems, he had acquired private knowledge of certain plumbago deposits, and it became a fixed purpose with him to develop these when opportunity should offer. Accordingly, in 1874 was formed the Phœnix Plumbago Company, for the purpose of working this mineral and conducting the various manufactures of which it is the basis. This business eventually absorbed his whole time.

Dr. Brown was twice married. His first wife, the mother of his three surviving children, was Miss Matilda Stein, whom he married in 1847, at Allentown. She died many years ago, and in 1892 he married again. His second wife survives him.

DR. WM. A. MOORE.

DIED, March 21, 1900, at Benicia, Cal., from heart-failure, Dr. WILLIAM ALEXANDER MOORE, in his forty-third year.

Dr. Moore was born at Madison, N. C., August 15, 1857, and was the son of Dr. J. S. Moore. Ere he had reached manhood the family removed to Martinez, Cal., and here, in his father's office, he began the study of dentistry. After visiting Baltimore for a season of instruction to further equip himself for his future work, he opened an office in Antioch, Cal. In

1881, however, he removed to Benicia, which became his home for the rest of his life.

An esteemed member of the State Dental Association and of the Pacific Coast Dental Congress, Dr. Moore's status in the profession was recognized in his appointment by Governor Budd, in 1896, as a member of the California State Board of Dental Examiners, in which body he filled the office of secretary until his death.

Conscientious and honorable, true to himself and to his friends, he was one of God's noblemen, and the deepest regret is felt at the abrupt termination of his well-spent life. The respect of the community was testified to both by the attendance at the funeral services at St. Paul's Episcopal Church, Benicia, of which he was a trustee, and by the very large number of friends accompanying the remains to the family vault at Martinez to perform the last sad rites. Among those present were Dr. Blackman, president of the Board of Dental Examiners, with Drs. Morffew and Drucker, also of San Francisco, and Dr. Tibbetts, of Sacramento, all being members of the board; also the lifelong friends of the deceased, Dr. McLease, of Oakland, and Judge Lynch, of Berkeley.

Dr. Moore married, November 27, 1890, at Danville, Cal., Miss Lina Boone, who with two daughters survives him.

DR. NATHANIEL WARE HAWES.

DIED, April 1, 1900, at Wrentham, Mass., NATHANIEL WARE HAWES, D.M.D., in his sixty-second year.

Dr. Hawes was born at Wrentham, August 12, 1838, and drew his first and his last breath in the same house. On reaching manhood, with a view to adopting the profession of dentistry he placed himself, in 1862, under the instruction of his uncle, Dr. Geo. E. Hawes, of New York city, with whom he continued for two or three years. He proved an assiduous pupil, and one who was acquainted with him at the time speaks of his having even in those days executed mechanical work of pronounced excellence. In 1865 he began practice in Wrentham and also at Foxboro. A few years later he opened an office in Boston, where his technical proficiency, together with his personal character, was destined to make him one of the best-known of its dental fraternity. He received the degree of D.M.D. from the Harvard University Dental School, in which he was for some time demonstrator, and afterward held for nine years the position of assistant professor of operative dentistry.

He was a member of the Harvard Odontological Society, and was one of the earliest active members of the Boston Society for Dental Improvement. He contributed some valuable papers to the literature of the dental profession. He was a man of genial manners and generous impulses. One of his professional comrades writes, "His unbounded hospitality is best known to us by the delightful outings that we had with him in his beautiful home at Wrentham. We shall miss his familiar face and the hearty grasp of his hand."

Dr. Hawes was twice married, and leaves a widow, formerly Miss Ida B. Sturtevant, of Wrentham, whom he married November 16, 1881; his first wife, whom he married January 18, 1865, was Miss Caroline C. Fisher, of Wrentham.

The following resolutions testify to the high place he held in the esteem of those who knew him best:

"WHEREAS, it has pleased our Heavenly Father to take from us our honored member, Dr. Nathaniel Ware Hawes; therefore be it

"*Resolved*, That we, the Boston Society for Dental Improvement, desire to place upon record our high appreciation of his professional standing; that we mourn his death as a personal as well as a professional loss, and desire to testify to our admiration for his efforts given at all times to advance the profession of his choice; and further

"*Resolved*, That a copy of these resolutions be sent to his family; that they be spread upon the minutes of our society, and that a copy be sent to the professional journals.

"R. R. ANDREWS,
"F. M. ROBINSON,
"*Committee*."

"H. S. DRAPER, *Secretary*.

DR. L. B. BRADLEY.

DIED, April 17, 1900, at Beloit, Wis., from bronchial pneumonia, Dr. LENT BRISTOL BRADLEY, in his eightieth year.

Dr. L. B. Bradley, in whom Beloit loses one of its oldest and most esteemed citizens, was born in Madison county, N. Y., July 21, 1820, and was educated at Westfield Academy. At the age of nineteen he began to study dentistry, placing himself under the tuition of Dr. Fellows, of Westfield. Shortly afterward he engaged in independent practice in the same town. In 1842 he left his native state for the West, at first to assist his father in Winnebago county, Ill.; a little later, to practice dentistry in Chicago, in partnership with Dr. William Kennicott. Two years later he removed to Roscoe, where, as also in Rockford, Ill., he was the pioneer dentist. This, too, was the case at Beloit, Wis., in which place after a few years he settled, making it his home until his death. Combining a character of strict integrity with a keen wit, he was a man both loved and respected by those who knew him.

Dr. Bradley leaves a widow,—his second wife. His first wife, whom he married in 1838, died nearly twenty years ago. Three children the issue of this union survive,—viz, Dr. James A. Bradley, Willis A. Bradley, and a married daughter,—all of Beloit.

DR. ROBERT G. CALDWELL.

DIED, February 23, 1900, at Seattle, Wash., from heart-trouble, Dr. ROBERT G. CALDWELL.

Dr. Caldwell's death occurred on the fifty-seventh anniversary of his birth, he having been born February 23, 1843. He was a native of Ohio, and here, when grown to man's estate and having found an attraction in the dental art, he commenced its study. His pursuit of dentistry, however, was soon interrupted by the breaking out of the war, and during the great struggle he gave his service to the Union cause in one of the regiments raised in his state. When peace prevailed he moved to California and resumed the practice of his profession. In 1880 he made a further migration, and established himself in Seattle, Wash. Here, with a family growing up around him, it seemed unlikely that he would make any more migrations. The Klondike excitement of 1897, however, which so profoundly disturbed Seattle's serenity and caused so many of his fellow-citizens to join in the northward rush, induced him also to go along. He remained in Dawson City until last summer, when he returned to Seattle, after having encountered a sore trial in the death of a daughter who had accompanied him. His own health, moreover, had deteriorated, and he had become subject to the cardiac affection which was to prove fatal.

Dr. Caldwell was a member of the G. A. R. and of various other fraternities. He leaves a widow and three children.

DR. CHARLES W. McCALL.

DIED, June 7, 1900, at his home in Binghamton, N. Y., after a week's illness, CHAS. W. McCALL, D.D.S., in his fiftieth year.

The deceased was the son of Dr. S. H. McCall, who, though he was for many years before his death a prominent dentist of Binghamton, had formerly resided at Franklin, Delaware county, N. Y., where, on August 24, 1850, Chas. W. McCall was born. The latter was carefully prepared for the profession in which he was to be engaged,—first by becoming a student in his father's office, afterward by experience gained in laboratories and offices in New York, and finally by taking the course of study of the New York College of Dentistry, being graduated with the class of 1876. He practiced for a while in South Orange, N. J., but in a short time returned to Binghamton to become associated in business with his father. After the latter's death the son removed the practice to his own residence.

Dr. McCall was one of the most active members of the Sixth District Dental Society. Free from selfishness, and much preferring to see its offices in the hands of others rather than in his own, he was nevertheless twice called to fill the office of vice-president, and twice that of president. He was a member of its Board of Censors at the time of his death.

Dr. McCall was a member of the First Presbyterian Church, and was prominent in business and social circles. He was one of the trustees of the Barlow School of Industrial Arts, and a popular member of the Dobson Club and the Broome County Country Club.

Fond of the study of languages, Dr. McCall found time even with his large practice to engage in this pursuit. He had indulged, too, in foreign travel, and had an extensive acquaintance with other lands.

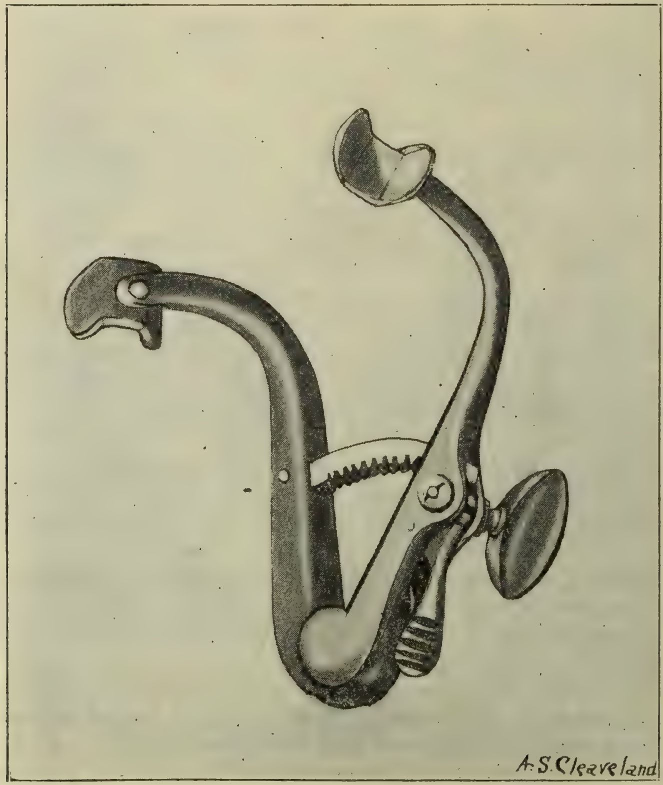
Industrious and business-like, yet professionally ethical and with always an appreciative word for his competitors,—in the removal of such a man dentistry has sustained a loss, and his friends in the Sixth District Dental Society an irreparable one. His fellow-members of the profession in Binghamton in resolutions of regret and condolence declare—"That in the death of Dr. McCall the dental profession of this city has been deprived of the companionship and counsel of one whose kind and genial manners endeared him to all as a man, and whose eminent success in his calling made it a pleasure to honor him as a dentist."

Dr. McCall married, on April 7, 1880, Miss Elizabeth Lyon Mandeville. She survives him, with one son, John Oppie McCall.

PERISCOPE.

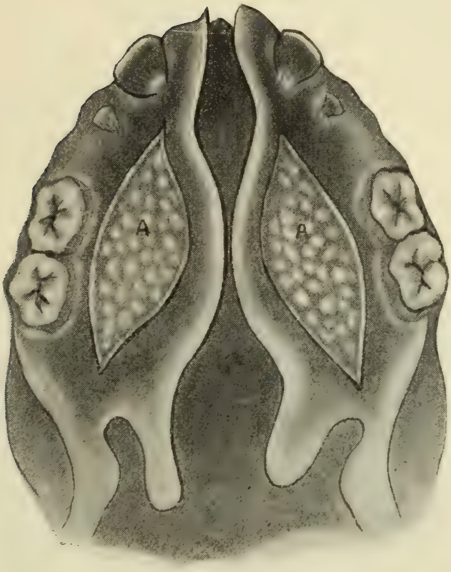
CLEFT PALATE. A NEW URANO-STAPHYLORRHAPHY.—In 1764 a French dentist, named Le Monier, proposed for the first time to close the cleft in the soft palate by paring the edges and stitching them together, which was successfully carried out by the elder Roux of Paris in 1819. In 1820, Warren, of Boston, and independently of Roux, brought before the profession a similar but somewhat better operation, which he had successfully performed. So closely do the two resemble each other in principle and technique that it might well be called the Roux-Warren staphylorrhaphy. This operation was followed by the best surgeons of that time, for about a quarter of a century by such men as Stevens, of New York; Mettauer, of Virginia; Wells, of South Carolina; Gibson, of Philadelphia; Hossack, the younger Warren, Mütter, and Pancoast in this country. Among the surgeons abroad who performed this operation may be mentioned Graefe, Dieffenbach, Sédillot, Liston, Fergusson, and Polloch. Fifty-six years ago Sir William Fergusson, of London, made the first marked improvement on the simple vivification and suture operation. He recognized that the tension on the ligatures was a great cause of failure, and decided that this tension was due to the contraction of the levator palati, palatopharyngei, and palatoglossi muscles. To re-

FIG. 1.



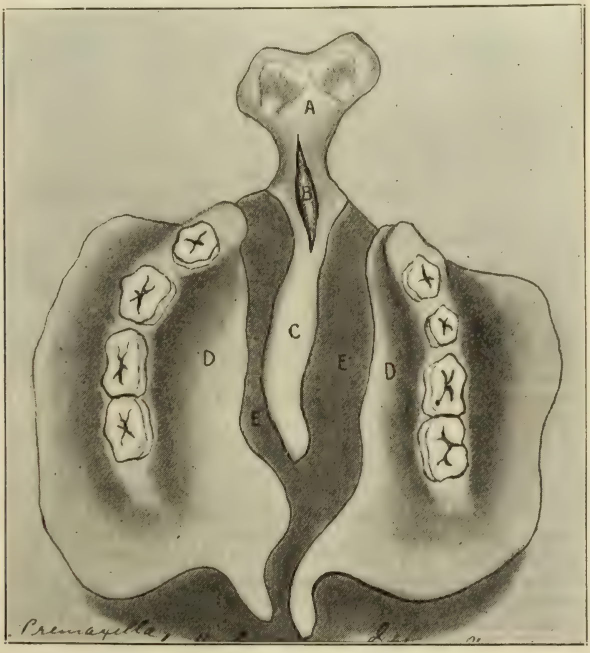
Mouth-Gag.

FIG. 2.



Crowding procedure for a wide cleft. A, A, gauze crowding the muco-periosteal flaps toward the center.

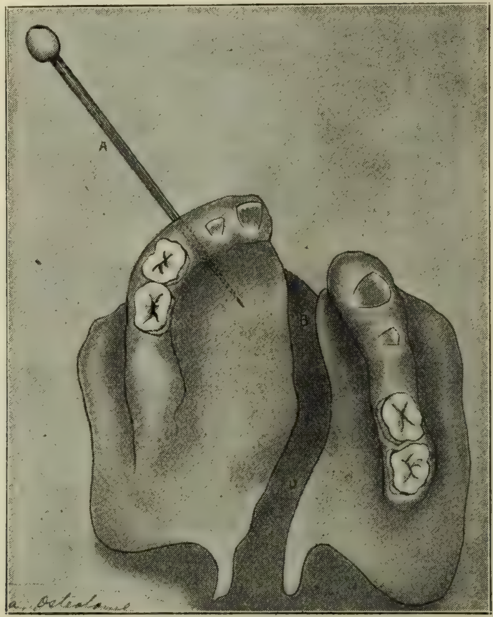
FIG. 3.



Os incisivum. A, premaxilla; B, incision to the bone; D, D, segments; E, E, clefts; C, ethmo-vomerine septum.

lieve this tension he divided these on either side. He devised a hoe-shaped knife, with which he severed the levator palati muscles by passing it behind the soft palate and cutting from behind forward. In this connection Fergusson was the first to make careful dissections of cleft palates on cadavers. The excellent results obtained by him were also secured by other surgeons who had followed him. His operation superseded the Roux-Warren one for several years. The next improvement recorded was in 1860, by Dr. Agnew, of Philadelphia, who pointed out that the tension of the soft palate is in a measure dependent on the contraction of the tensor palati muscles, and these he cut by making an anterior incision close to the hamular process of the sphenoid bone, and thereby obtained marked relaxation. About the same time Dr. Polloch, of London, carried out a similar procedure. From the ease with which the anterior incision could be made and the fact that it cut the lowermost fibers of the levator palati muscles as well, it soon became a favorite. With the exception of a flap-splitting of the soft palate, carried out by many surgeons, nothing new appeared on this subject until Dr. T. W. Brophy, of Chicago, introduced the application of lead plates to the soft palate, which bear the strain of the sutures, thus preventing muscular contractility and tension. He finds it unnecessary to cut the muscles on either side, and maintains that it is harmful to sever them.

FIG. 4.

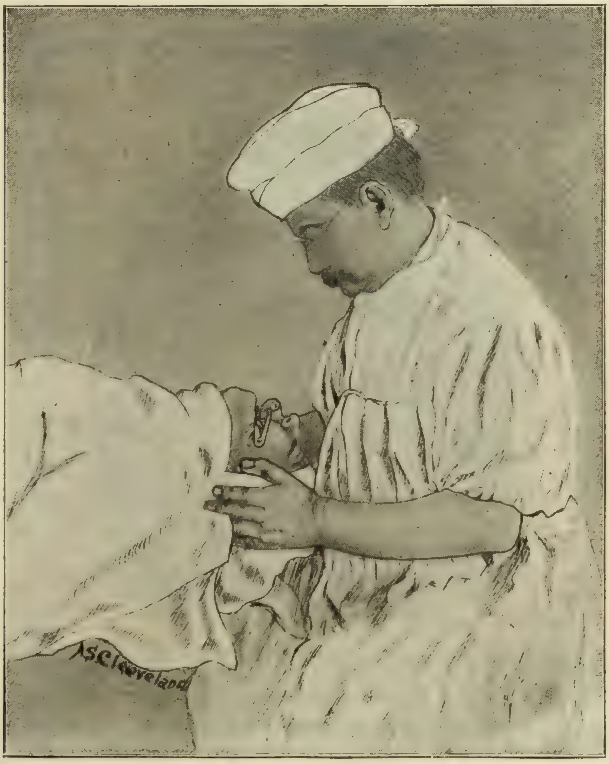


Supra-maxillary osteotomy. A, osteotome; B, cleft on one side.

Staphylorrhaphy was an established procedure in surgery before the closure of the cleft in the hard palate was attempted. Before fifty-seven years ago obturators were freely used. Dr. J. Mason Warren, of Boston, in 1843, published his method, which consisted in paring away the mucous membrane of each side, raising the flaps of mucous membrane from the bones and suturing them together. Langenbeck effected an improvement by raising the periosteum with the flaps and by making two lateral incisions, one along each alveolar process. In 1873 Sir William Fergusson came on the scene again with his ingenious osteotomy of the hard palate in its entirety, pared the edges of the segments of both hard and soft palate, and brought them together at one sitting, thus completing his urano-staphylorrhaphy. Mason, in 1874, suggested some slight improvements in Fergusson's operation. Garretson, of Philadelphia, applied to the jaws a horseshoe-shaped clamp, and with it forced the jaws together by means of a screw similar to that of Hainsby. Billroth frequently crushed the hamular processes together, and Wolff utilizes the alveolar processes to close the cleft. Lannelongue constructed a flap, in unilateral cases, from the mucous membrane of the contiguous surface of the nasal septum.

The Davies-Colley method I have performed a good many times, and like it very much. The cleft is bridged across by means of two flaps. One flap is raised laterally, its outer border being free, while it is left attached at the margin of the cleft. It is then turned upward into the cleft, its mucous surface looking toward the nasal cavity. The flap on the other side is raised like a tongue, its anterior end being free, and is brought across to the opposite side underneath the first flap, raw surface to raw surface, and there fastened with a few sutures. It is an excellent plastic operation.

FIG. 5.



Position of surgeon and patient.

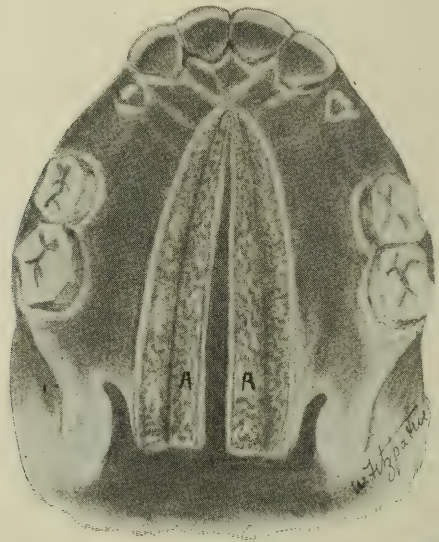
Brophy's Method (Park's Surgery).—This consists in forcing the two superior maxillæ together with stout silver wire fastened to a lead plate, one placed on the outside of each alveolar process. The approximation is effected by twisting the wire over one of the lead plates. The usual vivification of the segments is made, and sutures applied in the ordinary manner. In infants this operation is feasible. Its author claims but little shock, and excellent results. C. B. Porter, when patients have teeth, uses a vulcanite plate in the mouth to protect the soft palate (Warren-Gould's Surgery, Vol. ii, p. 26). Fillebrown makes an incision along the alveolar processes, raises two muco-periosteal flaps, turns them toward the center of the cleft, and there fastens them together with mattress sutures of silver wire, the edges being vivified and sutured with fine silk.

Instruments.—The only new instrument I wish to present is a mouth-gag (Fig. 1), which I devised and find suitable for all cases. It is small, strong, opens widely, is easily inserted into the mouth, quickly closes, does not strike against the shoulder, and lies close to the cheek.

Preparation of Patient.—Adenoids, enlarged tonsils, nasal catarrh, bronchitis, malnutrition, etc., should be treated first. The child should be in the best attainable condition locally and constitutionally before an operation is advised. The day before the operation a dose of castor oil and a few doses of strychnia should be administered. Irritating the mouth with antiseptic lotions for several days previously is contraindicated.

Age.—In my opinion, all operative procedures on hare-lip and cleft palate should be completed before the child begins to talk. The earlier the congenital deformity of the palate is rectified, the less defective will be the speech. In infants a few weeks old the mouth is small, the tissues are friable, and there is a tendency for the flaps to slough. Should the cleft be wider than half an inch, the complete closure of it is not undertaken at the first sitting, but one or more crowding operations can be done to lessen it. (Fig. 2.) In this case Langenbeck incisions are made, and iodoform gauze firmly packed into the wounds and beneath the muco-periosteal flaps in such a manner as to crowd them toward the center until they touch. When this is properly done the gauze will remain in place for a week or more. It is not removed until it begins to loosen, after which a second packing may be inserted, but usually this is not necessary, for the new granulation tissue is sufficient to hold the soft structures in their altered positions. Three or four weeks should now elapse before operating again. The palate bones are allowed to become covered over with firm fibrous tissue segments. The crowding operation is most suitable in a class of cases otherwise very difficult to treat, that is, when the segments are horizontal, and the roof is like a Norman rather than a Gothic arch. The flaps in this class of cases are shorter, and by the older methods great traction is employed to bring the pared edges in apposition, hence the frequent cause of failure. When the bony edge of each

Fig. 6.

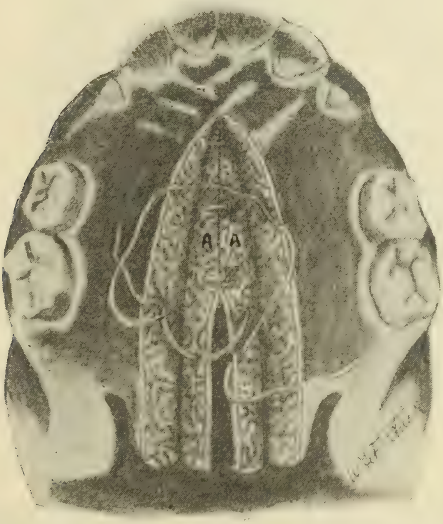


First step. A, A, flaps hinged by the mucous membrane on the nasal aspect.

segment is not well covered by mucous membrane, even though the cleft is narrow, a crowding operation is done as preparatory to the final closure of the cleft in order to obtain flaps sufficiently thick and well nourished to insure success. The more vertical the slope of the palatal segments, the more favorable the case is for operation by old methods.

Os Incisivum and Hare-lip.—The os incisivum, also called the premaxilla and intermaxilla, protrudes in the center in double hare-lip, and in single it often protrudes to one side, where it is attached, thus raising the nostril on that side far above the level of its fellow. This deformity has been dealt with in various ways. When met with in infants it is my practice to deal with it before operating on the cleft palate, but in older cases nothing is gained thereby, and then I repair the palate first. When possible, the intermaxillary bone is preserved. A V-shaped section is removed from the vomer subperiosteally (Fig. 3), through a longitudinal incision, the bone nicely fitted in between the superior maxillæ, and held there by means of a strong silver wire, taking care to pare off the edges on each side so as to obtain bony union if possible. If, however, the hare-lip operation is done early, it may not be necessary to perform any operation on the vomer, for in some cases it will be found that the os incisivum has receded to nearly its normal position. When the deformity is one-sided, it is easier to lower one nostril than to raise the other. This is done by making a supramaxillary osteotomy, as represented in Fig. 4. Here, too, when the hare-lip is closed in the infant, the deformity is greatly improved and the osteotomy may be obviated. In the development of the child the union of these bones naturally takes place from before backward, so that by repairing the hare-lip and waiting a few months the alveolar cleft is very much lessened.

FIG. 7.



Second step. A, A, flaps coapted by three sutures and fourth one being inserted.

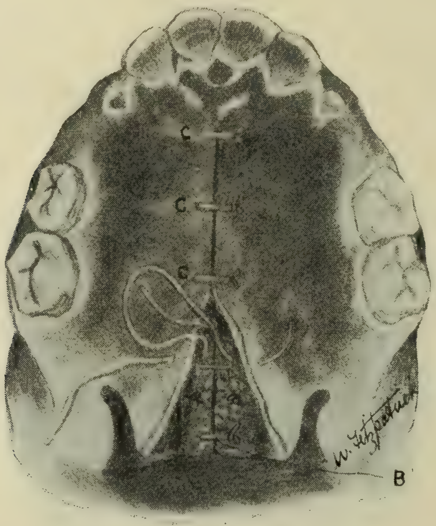
Ethmovomerine Septum.—The ethmovomerine septum is frequently very deficient or entirely absent. When present it materially facilitates the execution of plastic work in the roof of the mouth, by utilizing its mucous membrane.

A New Urano-Staphylorrhaphy.—The operation which I now wish to describe has been carefully studied and practically developed. It was done on fifty-three patients, extending over a period of eleven years. In 1889 I successfully performed it on three sisters. In one the defect extended through the soft palate alone, and in the other two the hard palate was involved, but not the alveolar process. Since then I have managed to prepare my patients so that finally in nearly all of them I could perform my operation, resorting to the crowding operation to this end.

Wrap the child in a sterile sheet with its arms extended along its sides; fasten a towel wrung out of a bichlorid solution around the head, or put on a rubber cap; place it on a table with a headpiece that can be raised or lowered; administer chloroform drop by drop; mop its face, mouth, and throat with equal parts of alcohol and water; with a four per cent. cocain solution on cotton, touch the palate and pharynx; if secretion is profuse, give a hypodermic of atropia, the dose to suit the age of the patient; insert the mouth-gag; sit at the end of the operating-table, with the patient's head well thrown back (Fig. 5), and you are ready for work.

The anesthetizer has a difficult task to keep the patient well under the influence of the chloroform, and also allow the surgeon sufficient time to work. It necessitates a wide range of the degree of narcosis, thus coming to and going under alternately, but this fluctuation in the administration of the chloroform is much safer than keeping the patient constantly in a state of surgical anesthesia, by spraying the chloroform through a nostril. Following are the steps of the operation:

Fig. 8.



Third step. *a*, *a*, flaps inserted into nostril; C, C, C, second row of sutures being inserted.

1. *Making the Flaps.*—With a slender, slightly curved, narrow-bladed knife, cut through the mucous membrane of the mouth about one-sixteenth inch from the edge of each segment, and divide all the soft structures to the mucous membrane on the nasal aspect of the palate, but not through it. (Fig. 6.)

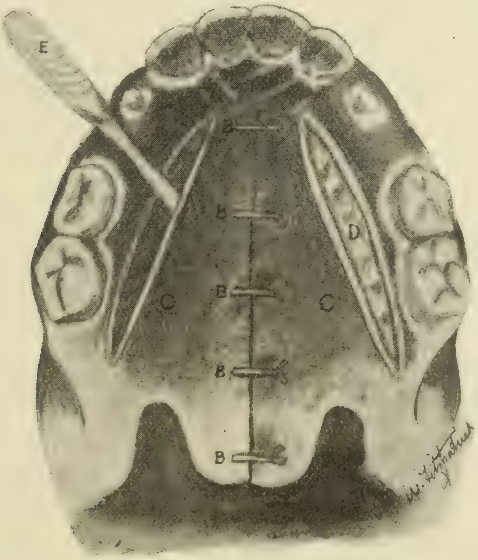
2. *First Row of Sutures.*—With a small, round, fully curved needle, not larger than one-half inch between the eye and the point, held in a suitable needle-holder, and threaded with fine silk, closely insert interrupted sutures by passing the needle through the free borders of the flaps from the mucous surface to the raw, and from the raw to the mucous surface, and tie them as you proceed from before backward, all the knots being situated on the nasal side. (Fig. 7.)

3. *Second Row of Sutures.*—Take the same needle and needle-holder and complete a row of interrupted stitches of horsehair on the buccal surface of the palate from the tip of the uvula forward, and tie them where apposition is possible without tension. The soft structures of the hard palate cannot

usually be brought together until the next step of the operation is taken. (Fig. 8.)

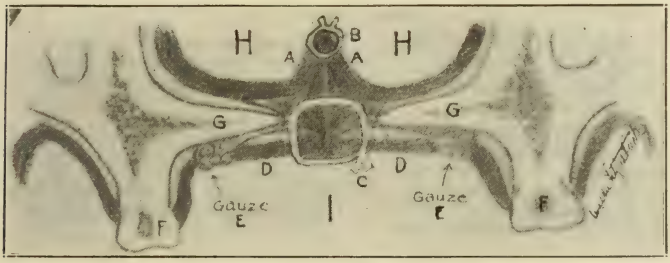
4. *Muco-Periosteal Flaps.*—Place the forefinger of the left hand on the hamular process; take a short, strong, slightly curved, narrow-bladed knife, and make a curvilinear incision on one side, beginning just behind the hamular process, cutting down to the bone and extending forward along the alveolar process, as far as desired; prevent hemorrhage by pressure with the finger and gauze; rapidly raise the muco-periosteal flap, with a strong periosteal elevator, from the segments of the hard palate, and immediately pack the wound firmly with iodoform gauze. Repeat this performance on the opposite side, and tie the horsehair stitches not already secured. The soft structures of the hard and soft palate are beautifully held in apposition without tension on the stitches. (Fig. 9.)

FIG. 9.



Fourth step. B, B, B, B, B, second row of sutures tied; C, C, muco-periosteal flaps; D, gauze packing; E, periosteal elevator; the flaps and first row of sutures are no longer to be seen.

FIG. 10.



Supposed transverse section when operation is finished. A, A, flaps made and turned into nostril; B, first row of sutures; C, second row of sutures; D, muco-periosteal flaps coapted by C; E, E, gauze; F, Garth; G, segments of bone (palate); H, H, nasal cavities; I, mouth.

In packing the iodoform gauze in the wounds, fixation points are obtained by forcing some of it into the bone, also between the teeth and under the mucous membrane. If this is properly carried out, the gauze will remain in place for a week, and sometimes longer. It is removed when it becomes loosened, by which time it has generally fulfilled its usefulness. A second and occasionally a third packing may have to be inserted.

It will be observed that this is not a flap-splitting but a flap-formation operation, the flaps carrying with them two narrow strips of the firm, strong, buccal mucous membrane of the palate, which holds sutures securely, and when they are turned upward and held in coaptation by means of the first row of sutures they form an ideal protecting roof to the raw surfaces beneath them, and afford twice the width of denuded tissues for apposition, and the nasal muco-purulent discharge is shed off to either side. (Fig. 10.)

After-Treatment.—Every two or three hours the mouth is to be cleansed with a feeble antiseptic solution, such as boric acid, etc. The child readily takes to whisky and water, which is given after taking nourishment, to wash the liquid food off the area operated on. Nutrient enemata are to be administered if deemed necessary, and the stitches removed not earlier than the twelfth day. If the patient cries much, we should keep it quiet with an opiate. A special nurse, experienced in caring for cases of this nature, should be employed.

Cases Suitable for the Operation.—1. The cleft in the hard palate must not be wider than half an inch, but if it is, a preparatory crowding operation is done first. 2. The mucous membrane covering the inner edge of each bony segment should be thick and well nourished; if not, the crowding operation is resorted to primarily. 3. It is suitable for all clefts in the soft palate.

Commendable Features.—1. The results are vastly better than I have been able to obtain by any other method. I have had only one primary failure. 2. No tissue is removed. 3. Very broad raw surfaces are coapted. 4. The danger from sepsis is minimized by turning the flaps upward, as described.

Disadvantage.—It is more difficult to perform.—*Alexander Hugh Ferguson, M.D., Professor of Surgery, Chicago Post-Graduate Medical School, Surgeon-in-Chief, Chicago Hospital, in Journal of the American Medical Association.*

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JULY, 1900.

July *3*.—No. 652,751, to John A. Daly. Metal lined vulcanized plate.
“ “ —No. 652,752, to John A. Daly. Metal lined vulcanized plate.
“ “ —No. 652,958, to Peter Fraser. Centrifugal fountain spittoon.
“ *17*.—No. 654,109, to Herman Backstrom. Dental articulator.
“ “ —No. 32,945, to Mathew M. Kerr. Design for nerve broach.
“ *24*.—No. 654,527, to Theodore F. Driskill. Articulating plate.
“ *31*.—No. 654,869, to Frederick H. Berry. Dental engine.
“ “ —No. 655,051, to Arthur W. Browne. Fountain spittoon.

THE

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ORIGINAL COMMUNICATIONS.

STUDY OF CERTAIN MICROBES OF DENTAL CARIES.

BY J. CHOQUET,

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(Read before the International Dental Congress at Paris, August 8, 1900.)

IN writing this paper we have not undertaken the study of all the micro-organisms of dental caries, but it has been our aim to specialize that point the etiology of which has as yet not been studied,—namely, the recurrence of caries under fillings. When we say fillings we mean those that have been carefully inserted, the cavities thoroughly cleansed and correctly prepared; we also have reference to good filling-materials.

It is too absolute to affirm, as Dr. Cruet does, that recurrence of decay does not take place if the cavity has been carefully prepared and cleansed and a layer of white and hard dentin left in the bottom. Prominent practitioners who combine their clinical observations with those of the laboratory, more especially the microscope, are diametrically opposed to this opinion. They have proved what they advance. Dr. Galippe says it makes no difference with what amount of care the cavities have been prepared, and it does not matter what antiseptics are used to secure sterilization, there will always be found tubuli invaded by micro-organisms.

Dr. Miller, in his paper on the comparative rapidity of penetration into decalcified dentin of different antiseptics, says that the practice of superficially bathing cavities of decay with an antiseptic before inserting the filling was followed by many practitioners even before the appearance of the microbe theory; that the practice is universal, and its object is the devitalization of the germs which may have been left in the deeper layers of dentin.

In an article in the DENTAL COSMOS (vol. xxxi, page 917) we find the following statements: "There are very few practitioners who place so high an estimate upon their own skill and thoroughness as to imagine that they excavate every cavity perfectly." Further on, "It may appear remarkable that, while so much attention has of late years been bestowed upon the antiseptic treatment of root-canals, very little attention has been given to the subject of the antiseptic materials for filling cavities of decay."

In an interchange of letters which took place recently between MM. Williams, Wedelstaedt, and Grayston (see *The Dentist,* 19-26 October, 1899), Grayston says, "The dentin which seems hard under burs and excavators can nevertheless be entirely infected."

Dr. Williams, while contending that there are very few chances for the recurrence of decay under a gold filling after ten years, admits, nevertheless, the possibility.

We are of the opinion of Galippe and Miller, and we also believe that notwithstanding all the care used in the preparation of a cavity and its subsequent filling, we can never affirm that there will not be a recurrence of decay. We do not in this include caries arrested by the formation of secondary dentin, as we would in that case go out of the limits of the question.

How is it possible to explain those cases in which we find perfect fillings of amalgam or cement inserted for five, ten, fifteen, twenty, and even twenty-five years, and that under these fillings we find softened dentin, more or less discolored, which in time will cause the complete destruction of the pulp? We take it for granted and set it down as a principle that those fillings were good, and that there was no space or interval in the continuity of the filling and the walls of the cavity.

It is necessary to admit in such a case that the cause is an internal one, and that it has developed as the consequence of the presence of certain micro-organisms left in the tubuli of a kind of dentin which appeared to the eye and touch healthy.

It is to these species of slow development that we have directed our attention and efforts.

Out of three filled teeth in which the fillings had been preserved intact, we succeeded in isolating and studying specially five species of microbes, which we will designate under the Roman numerals I, II, III, IV, V. These teeth were extracted for these reasons:

1. A lower left second molar in which the buccal surface had been filled seven years before was extracted to prevent trouble accompanying the difficult eruption of the third molar.

2. An upper left second bicuspid with a filling in the mesial surface was extracted to facilitate the regulation of the cuspid. Filling four years old.

3. Upper right third molar; occlusal cavity; amalgam filling three years old. Tooth extracted on account of pulpitis.

We inserted these several fillings, using all necessary care and taking the precaution of moistening the bottom of the cavity by means of cotton saturated with an antiseptic solution.

The number of microbes found under these fillings was much less than was found in the superficial and even deeper layers of decayed dentin when in contact with the oral fluids.

These five species, without being entirely anaërobic, nevertheless present a marked tendency to grow better in the absence of oxygen.

In regard to particular properties, they present marked variations.

They develop very slowly in the culture-media generally employed; nevertheless, in the course of time and as a consequence of their development, which for five years has taken place out of their own medium, they seem to have gotten acclimated, and grow now with great rapidity. The morphological characteristics have not suffered any change, while the chemical reactions, weak at the beginning, are to-day entirely changed in one way or another.

Certain species only grow at the temperature of the incubator (36 to 37 degrees), while others grow just as well at ordinary temperature.

We have been unable to find a similarity between these species and those heretofore described, except that we suppose Nos. III and IV to be a variety of pneumococcus.

These five microbic species can be subdivided into three classes of micrococci and two classes of bacilli. A description of them will be given later.

EXPERIMENTS OF INOCULATION.

The study of the etiology of caries, notwithstanding the difficulty of finding an appropriate medium for the separate culture of the different species, became a very difficult task when the attempt was made to produce artificial caries,—not on teeth out of the mouth, but on tissues of living animals—on teeth of physiological animals.

We have been unable to find records of this kind of experiments in any of the works treating on the etiology of dental caries. Underwood and Milles, Miller, Goadby, and Williams produced artificially the disorders of caries on tissues which did not possess the physiological integrity necessary for this kind of experiments. These experiments were made in some cases on teeth placed in some special nutritive media approaching as nearly as possible the chemical composition of saliva; in others they were carried on on calcified or decalcified longitudinal sections similar to those used in microscopical examinations,—always on dead organs devoid of the physiological integrity which ought to be reckoned with in this kind of experiments.

We have tried to do better, in order to approach as closely as possible to the phenomena which take place in dental caries.

We decided on the sheep as the animal which promised the greatest chances for success, because of the size of the incisors; the labial surface is more or less like that found in the human lower incisors, and because of the relative docility of the animal. The sheep was placed on a table and securely bound, the rubber dam being applied over one or two incisors to prevent contact with saliva; the superficial layers of the tooth were removed with a chisel, and with a wheel bur a cavity three mm. in depth by four mm. in width was prepared. The *débris* was removed with a current of hot air, and the most difficult and delicate part of the operation was begun. A very small drop of bouillon which had been inoculated twenty-four hours before was deposited in the bottom of the cavity. Over this a small platinum (thin) cap was placed. This cap had been previously heated to redness, and in its concavity a small particle of gelatin, culture D, had been placed. A cement filling was made over the cap, and, in order to avoid contamination with saliva, a drop of wax was melted over the cement as soon as it began to harden.

This experiment was made on the first right lateral incisor of a sheep possessing its full dentition.

The microbic species used was that we have designated as No. I.

During the nine months which the experiment lasted the animal did not seem to feel any discomfort while masticating. At the end of this time it was slaughtered, and the following phenomena were discovered:

The cavity which had been made was found to be nearly oval in form. The dentin, instead of being white, as it normally is, was of a yellowish hue. It was also softened. The softening, reaching a slight depth, was very plain, and a great deal more noticeable in the widest portion of the cavity, at the point where the diameter of the cavity had increased. A small particle of this softened dentin was carefully taken, and on inoculating the same kind of media as had been originally used we recognized the same species we had used for the original inoculation.

The artificially decayed teeth were decalcified, and sections were made which showed that, although the softened zone was very small, the canaliculi had been invaded; the organisms could be found in the tubuli at a depth of two and one-half mm. The appearance of this section is not so typical as sections from teeth normally decayed.

At twenty-five diameters the section presented the following appearances: The portion of the cavity which had not been attacked by microbe No. I was apparently normal. The coloring reagent, methyl-violet, was easily washed out. The borders were very plain, and seemed to have retained the appearance made with the wheel bur while drilling the cavity.

The part of the cavity which had suffered from the action of the microbe seemed, on the contrary, to be entirely disorganized. We found in certain places small cavities like those found in normal decayed human teeth. At one hundred and fifty diameters the basis-substance appears to have liquefied, and the tubuli appear separated in transverse section. At eight hundred diameters it is possible to get a plainer view of the destruction of the basis-substance of the dentin, which is entirely corroded at the borders.

On careful examination of the tubuli we found scattered here and there microbes of the kind used for the original inoculation. We wish to emphasize the fact that the microbes were found scattered at different points in the course of the tubuli, and not in masses, as in normal dentin. If the animal had not been slaughtered until a year later it seems probable that we would have found the same effects as in man, except that in the sheep we do not find the ramification of the tubuli near the enamel.

Thus was demonstrated the possibility of producing artificial caries in a living animal.

A report of the result of these experiments was given out long before the date of the International Dental Congress,* and the section was submitted to a careful macroscopic and microscopic examination.

We cannot repeat here all the experiments of the different investigators who have worked on the etiology of dental caries; not even the studies of Galippe and Miller describing the species of microbes observed by them. We therefore refer inquirers to the books of those authors, speaking here only of the latest article on the subject by Mr. Kenneth Goadby, demonstrator in Guy's Hospital, London.

We do not agree with Mr. Goadby in the conclusions he draws from his researches. We criticise him as being a little too personal, considering that he is not the first to promulgate the theories he advances; also we have noticed in his articles various irremissible errors.

Mr. Goadby in his paper, entitled "The Micro-Organisms of Dental Caries,"† after an introduction on the researches on this affection, speaks of the necessity of the unification of culture-media in order to conduct satisfactory researches, and also for the benefit of those who would desire to take up and verify them, who in that case could work on a similar basis.

This proposition is a very just and rational one, especially when we know what modifications and transformations can occur in the morphology of a microbe, according to the medium in which it grows.

Is it necessary to recall in order of procedure the experiments made by Raullin when bacteriology was in its infancy,—experiments made by means of the liquid which bears his name and in which a slight modification in the composition is sufficient to arrest or to transform the growth of a given species? Or is it necessary to recall the works of Gissard concerning the Bacillus pyocyaneus, which he could at will cause to produce pyocyanin or fluorescence, according to the way he cultivated them, either in albumin or at a heat of thirty-seven degrees for five minutes?

The proposition of Mr. Goadby is, then, a very natural one, and to emphasize his demand for a uniform method of culture he quotes the proposition made to the committee of American bacteriologists. Long before he made his proposition or before the report of the committee of American bacteriologists there was published in France a very keen article entitled "The Unification of the Methods

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**Comptes rendus,* Académie des Sciences, April 2, 1900; Société de Biologie, March 31, 1900; Société d'Odontologie, April 3, June 5, 1900.

†*Journal of the British Dental Association,* February 15, 1900; DENTAL COSMOS, April, 1900.

of Culture in Bacteriology," by M. L. Grimbert, pharmacist of the hospitals and professor in l'Ecole Dentaire of Paris.*

We agree with Mr. Goadby in regard to the necessity of working on the same basis, but we are astonished that he does not tell us his culture-media, notwithstanding the fact that we know in how many different ways bouillon is prepared in the laboratories.

Concerning the first experiments of Miller on the microbes of the oral cavity, it may be remarked that although we should consider that at that time bacteriology was in its infancy, nevertheless he occupied himself with the fermentations which these microbes could cause. He worked on their pathogeny by inoculating mice and rats, and as a consequence he did not limit himself exclusively to the morphology.

Mr. Goadby thinks, and we agree with him, that in order to name a new microbe it must present such peculiarities in its biological, pathological, and biochemical properties that we should be able through those peculiarities to distinguish it from other species. The biochemical are, in our opinion, those properties which will greatly facilitate this distinction and identification.

It is on this point that Mr. Goadby contradicts himself by leaving out the chemical questions; that is, the action of the microbes on carbohydrates and nitrogenous substances. In fact, we cannot admit that the only nitrogenous substances susceptible of being attacked by the Bacillus necrodentalis, Bacillus furvus, and Bacillus plexiformis should be milk and peptone. There are probably other substances susceptible of undergoing fermentative changes which can be very active when under the influence of these organisms. For instance, glycerin, saccharin, lactose, dextrin, mannite, are some of the substances Mr. Goadby has not used in his experiments. We do not know if those microbes dissolve cooked albumin, if they cause fermentation of urea, if they convert nitrates into nitrites.

The author tells us that none of the microbes that he has studied have produced indol in the peptone solution, but this is not extraordinary when the reagent he has used to demonstrate the presence of indol is composed, as the author tells us in his previous article,† of sulfuric or nitric acids, ignoring the potassium nitrate, which is not only useful, but absolutely indispensable to obtain the red currant coloration peculiar to indol.

Mr. Goadby criticises the theory upheld in Dr. Williams's remarkable work,‡ as to the decalcification of enamel through the rapid deposition of micro-organisms over the surfaces of teeth; but to-day the chemico-parasitic theory is not only admitted, but also recognized as the only explanation. This theory is certainly rational. It is true that the demonstration was not complete. Dr. Williams admits that he did not cultivate all the species in artificial media, but, just the same, the theory has all the chances of being recognized and accepted. Then Mr. Goadby finds fault with Dr. Williams for the omission among the organisms of one species which he and Mr. Washbourn have constantly found in three hundred mouths examined. They also found this organism in one hundred and fifty mouths in pure culture. We refer to the streptococcus designated by Mr. Goadby under the name of Streptococcus brevis.

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*_Archives de Parasitologie,_ 1898.

†_British Dental Journal,_ February, 1899.—"Micro-Organisms of the Human Mouth," v, 18.

‡J. L. Williams, "A Contribution to the Study of Pathology of Enamel." DENTAL COSMOS, 1897.

The frequency of the streptococci in the oral cavity (where it occurs in many different forms) was first pointed out by Netter in 1889.

It may be that Mr. Goadby and Mr. Washbourn found the streptococcus first described by Marot,* in which case they could have identified it by carrying the growth on a potato, where this microbe grows very well in contradistinction to the other species which do not grow on this medium; or by inoculating any animal, say the white mouse. If septicemia does not take place there is every reason to think that it is Marot's streptococcus.

We do not admit, then, that Mr. Goadby should claim to have been the first to discover the presence in the mouth of the streptococcus, should it be the Streptococcus brevis or any other.

We are astonished to observe that authors who have studied the streptococcus never mention the names of those in France who have published works as interesting as those of Fehleisen or Lingelsheim, works liks those of Marot, Etienne, Veillon, Widal and Besancon,† Roger,‡ Marmorek, Vincent, and many others.

In going carefully over Mr. Goadby's work we noticed that sometimes he goes out of the limits of the question (etiology of dental caries) to occupy himself with the microbes found in the saliva and over the teeth. This is, for instance, the case with the Leptothrix buccalis.

We find that among the anaërobic species Mr. Goadby has obtained and cultivated from the deep layers of carious dentin the mesentericus (ruber, vulgatus, fuscus). We cannot admit that those species are true anaërobic organisms. You may call them anaërobic facultatives if you please, but never pure anaërobic. The author probably found himself in the presence of some species which, while not the mesentericus, has some likeness to it.

Where we agree in every respect with Mr. Goadby, and where we find his superiority, is in his finding that the liquefying properties are so frequently possessed by the aërobic species taken from the surface of decayed dentin. These species liquefy gelatin and serum rapidly, and give a marked coloration to the nutritive media in which they have been cultivated, the phenomena depending entirely on the conditions present.

We also think, as Mr. Goadby does, that the species obtained

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*Marot, "Un streptocoque à culture apparente sur pomme de terre." *Archives de Médecine experimentale,* 1893, page 548.

†Vidal et Besancon, "Etude sur les diverses varietes de streptocoques." *Archives de Médecine experimentale,* May, 1896.

‡Roger, "Le streptocoque." Société de Biologie, February 26-March 30, 1895.

from the deeper layers produce one or more acids, but not so rapidly as he states, as the microbes which we have studied do not begin to acidify the liquid culture-medium before the fifth or sixth month. In any case, we wish to remark that the species Mr. Goadby speaks of are facultative anaërobic.

Mr. Goadby accepts Miller's demonstrations that the first stage of dental caries consists in the disintegration of the calcium salts, but we do not see the reason why, after criticising Miller for having worked with impure cultures, he did not carry his experiments of confirmation on the same basis; that is, on undecalcified sections. In fact, having at his disposal pure culture of his Bacillus furvus and his Bacillus plexiformis, we think it would have been to his advantage to have used sections of dried teeth rather than decalcified sections.

We have made comparative experiments with certain common microbes, such as the Micrococcus roseus and Bacillus megatherium, and we have been able to see clearly that undecalcified sections of teeth placed in tubes of peptonized gelatin were, after a certain time, completely corroded by contact with those species. As a consequence we think that it would have been preferable for Mr. Goadby to have those microbes act on undecalcified sections in order to see if they had any digestive action either on albumin or on starch paste.

We cannot advance anything in regard to the property said to be possessed by some species, of having a liquefactive action on gelatin and no action whatsoever on dentin; but, on the contrary, we can affirm that certain species (No. I at least) do not liquefy gelatin but dissolve dentin.

With regard to the Bacillus necrodentalis which Mr. Goadby has so often found in pure cultures in the deep layers of dentin, and to which he seems to attribute some prominent part in the process of dentin destruction, it is regrettable that its action should not have been tried on carbohydrates and nitrogenous substances.

Mr. Goadby tells us that he did not observe the presence of gases, but he forgets to state in what medium; and we think, judging from the changes that milk undergoes, that it would have been very interesting to see the fermentative action of this microbe on lactose or some other similar body.

In concluding, he says and maintains that in dental caries:

1. The liquefying organisms are in the majority of cases aërobic.
2. The majority of micro-organisms found in the deep layers of dentin are producers of acids.
3. It does not follow that because gelatin is liquefied, dentin will be digested (dissolved).

Except some few points which we have answered, giving our opinions at length, we agree with Mr. Goadby, and we cannot, in consequence, be accused of systematic defamation.

Bacteriology, especially that part which deals with the etiology of dental caries, is in its infancy, and we should take every precaution to avoid error.

We found some omissions in Mr. Goadby's article to which we were obliged to refer, but he will recognize that we have not departed from the limits of courtesy.

NUTRITIVE MEDIA.

The nutritive media that we have used in our experiments are:

1. Peptonized bouillon
   Peptonized gelatin } at 1 per cent.
   Peptonized gelose

2. Bouillon glycerophosphate of calcium
   Gelatin glycerophosphate of calcium } at 1 per cent.
   Gelose glycerophosphate of calcium

3. Special bouillon.
   Special gelatin.
   Special gelose.
4. Tooth gelatin.
5. Potato.
6. Milk.
7. Starch.
8. Carbohydrates.
9. Nitrogenous substances.

Being absolutely convinced of the necessity of unification in culture-media, and to avoid criticisms such as we have just made upon Mr. Goadby, we give not only the composition of the nutritive materials we have used, but also and especially their preparation.

Our bouillon is always prepared by macerating for four hours 500 grams of beef in one liter of distilled water at ordinary temperature. It is then filtered through a wet filter paper and boiled for five minutes. One per cent. of peptone is added. The liquid is then neutralized and put in the autoclave and left there for ten minutes at 115° C., filtered and put in test tubes. Salt is never added to the bouillon of whatever formula. This is the formula of ordinary bouillon, or bouillon A. The bouillon glycerophosphate of calcium has the same composition as the preceding, with the addition of one per cent. of glycerophosphate of calcium. The formula is then:

Bouillon, 500 grams;
Peptone, 5 grams;
Glycerophosphate, 5 grams.

Special bouillon has the following formula, which approaches as much as possible the chemical composition of the human tooth:

Bouillon, 500 grams;
Peptone, 5 grams;
Phosphate of calcium, 50 grams;
Carbonate of calcium, 10 grams;
Phosphate of magnesia, 5 grams.

After mixing all these substances, the liquid is sterilized, filtered to such a degree that the liquid should have a lemon yellow color, and should not present any trace of the substances used.

The nutritive media, like gelose and gelatin, are incorporated to the bouillon in the proportion of twelve per cent. and seven per cent.

There is another solid special nutritive medium which approaches as much as possible the chemical composition of dentin, and which is prepared in the following way: To 125 grams of simple bouillon, without peptone and neutralized, are added 31 grams of a very fine powder obtained by filing a hippopotamus tooth. The liquid is sterilized in the autoclave at 115° or 120° C. for fifteen minutes, and, without being filtered, is put into test tubes, which are then sterilized at the same temperature. For inoculation in striæ the tubes are placed in an inclined position. In other cases they are to have an upright position. After cooling a good, transparent gelatin is obtained. It dissolves at about 19° or 20° C., and presents at the bottom a white layer, which is the result of the settling of the dentin. The other media used are—nitrogenous substances: peptone, cooked albumin, milk, urea, nitrates, starch. Carbohydrates: glycerin, mannite, dulcite, glucose, saccharose, maltose, arabinose, lactose, dextrin, inulin. For the composition of these substances the reader is referred to the extensive work of M. Grimbert on the unification of culture-media in bacteriology.* We will add that when working on urea we put a little chalk in the bottom of the tubes.

We insist upon the use of those special media which we have obtained after many experiments, and whose formulæ have already been given. These media have given us the best results in regard to the development of the species studied. The media that we particularly prefer are the gelatin, D, B, and G.

Concerning the Non-specificity of the Microbes of Dental Caries.

It could have been possible for us at one time to have supported the theory of the specificity of certain microbes in the production of dental caries, but as we proceeded in the study of this question and in cultivating the different species obtained from the superficial and deeper layers of dentin we became more and more convinced not only that there was no specific microbe, but that its existence was an impossibility. In fact, according to the chemico-parasitic theory, this affection presents two absolutely defined and distinct stages: (1) Decalcification of the hard external portions of the tooth, as a consequence of the secretions of certain micro-organisms yet to be determined, although Leon Williams has done a great deal toward the illumination of this question; (2) penetration of the living tissues by these organisms, producers of acids, or by some other kind, and their subsequent growth in those tissues,—a growth which must go on with ease, judging from the histological structure of the tooth; that is, the dentin, dentinal tubuli, dentinal fibers, and interglobular spaces, or spaces of Czermarck.

According to the definition given by Dr. Frey, caries is an affection which proceeds from without inward. In our opinion, once decalcification has taken place the remainder of the work is performed by other organisms from those first concerned; these give up their places to an immensity of other species of relatively very small

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*See *Archives de parasitologie*, 1898.

volume, which can penetrate with ease into the basis-substance of dentin which has been slightly decalcified, or into the dentinal tubuli, which, as we know, are smallest and greatly ramified in the vicinity of the enamel.

To make it appear, as we see in many works on dental pathology, that the leptothrix threads penetrate the dentinal canaliculi is absolutely irrational, and such a statement could be made only by one who had never made any microscopical study, or at least had not compared the caliber of a dentinal tubuli near the enamel with the diameter of any leptothrix.

Dental caries, when the disease is localized in the dentin, is of polymicrobic origin. There is no specific microbe; the existence of one could not be possible. All the species obtained from the superficial and deep layers of softened dentin, and even from the dentinal tubuli, away from the softened zone,—all these species are, we will not say common (the inoculation of certain microbes which we have found having proved their pathogeny), but they all originate from the oral cavity.

We are among the first to recognize that it is impossible to isolate a microbe by microscopical examination alone; nevertheless, without expecting to identify them, we can, with the microscope, make the distinction between a micrococcus and a bacillus or a thread. So, if we examine a section of decayed dentin, even with low powers, we shall never find just one species of micrococcus or bacillus, but always microbic associations. Sometimes the cocci will be in greater numbers, sometimes the bacilli, according to the portion of dentin examined, whether from nearer the surface or from deep in the structure of the tubuli. Some species may preponderate, and we must consider the microbic antagonism which must exist in the tooth, just as on the body, which makes the preponderance of either the cocci or the bacilli.

It may be justly remarked that the penetration of the microbes into the tubuli proves their anaërobic properties. To this we reply that a great majority of the microbic species found in the mouth are not true aërobic, but facultative aërobic. In fact, the number of pure anaërobic species is absolutely small, so that we cannot admit the specificity of a certain microbe. If certain species are found more frequently than others in carious dentin, and especially in the depths of the tubuli, it must be due primarily to microbic antagonism existing between the great number of species which have gained entrance into the canaliculi, and also especially to the surroundings of a new field of culture. The true aërobic species and the facultative anaërobic which were mixed up at the opening of the tooth became gradually accustomed in the canaliculi to their new habitat. The anaërobic facultative species had their anaërobic properties developed, and the aërobic had either to stop in their destructive course toward the pulp or had to get gradually accustomed to the absence of oxygen. This explains the great decrease of microbes in the deeper portions of the tubuli, where we find only a few species, as has been proved by the experiments of Galippe and Vignal, Miller, Goadby, and our own.

We are convinced that these micro-organisms have no specificity, such as we find in anthrax, cholera, tetanus, or the plague. They originate in the saliva, and in the course of time it will be possible to identify them by means of cultures and growths in laboratories.

Study of Five Microbic Species found under Fillings.

The species which we have specially studied among those we obtained from the deeper layers of dentin in contact with good fillings, and which were derived from the three cases referred to in the preceding pages, are the following:

Species No. I.

Bacillus, facultative aërobic, with marked tendencies to grow better in vacuum than in the air. The temperature of the incubator seems to favor rapid development in bouillon. The favorable culture-media are very few, as this species does not grow in gelose of any composition or on potato. This bacillus presents, as we will see, extraordinary peculiarities. Thus, if the growth is carried on in bouillon inoculated with a very small particle of culture taken from gelatin, the development is very rapid; but if we inoculate a culture from a growth in bouillon the development is slow, and sometimes never takes place. In the same way, in order to inoculate tubes of gelatin, we must use particles from growth in bouillon, otherwise no result is obtained. This species possesses the very extraordinary property of changing its form. Thus if inoculated in gelatin they present the bacillus form; if inoculated in bouillon they are entirely transformed. Under the microscope we see them changed into ramifying bodies with rounded and swollen extremities. If a drop of bouillon is transferred to the gelatin the primitive form reappears.

Bouillons.—Of the three classes of bouillon that we have used, the growth went on with greatest rapidity in bouillon C. In general the growth requires four hours in tubes stopped with cotton, and two hours and a half in vacuum tubes. The growth has the form of a small, well-defined cloud of a silky appearance, localized in the upper portion of the tube. After ten days this cloud diminishes in an imperceptible way, the bouillon clarifies, and there is found at the bottom of the tube a finely granular deposit.

Bouillon B comes next in rapidity of growth. This bouillon becomes clouded at about the fifth hour, just as well in the air as in the vacuum. A few bubbles of gas are produced, and this kind of fermentation lasts about forty-eight hours. About the tenth day the upper third of the liquid becomes cleared off, while the remainder continues to be cloudy.

Bouillon A takes still longer for the cloudiness to appear,—from seven to eight hours.

These different kinds of bouillon, all of feeble alkaline reaction before inoculation, become acid at the sixth month.

If the examination is made with a hanging drop preparation, a marked rotary movement is observed. At about the fifth or sixth day all movements disappear.

Gelatin.—Rapidity of growth, B, D, C, A. This species when inoculated in Pétri dishes, prepared in the ordinary way,—that is, by inoculating a tube of liquefied gelatin with a particle of culture in bouillon,—begins to grow at about the fifth or sixth day. The colonies are of oval form and yellowish color, and become round and white, with a metallic luster as they come nearer to the surface of the gelatin. It should be remarked that this species required at the commencement of the experiments two months in order to obtain the same result.

These colonies are not *liquefacients.* They possess the peculiar property of producing at about the twentieth day a cloudiness all through the gelatin, and to retard, and even to prevent, any fungus growth, which could be produced by the depŏsition of fungi on the surface of the gelatin.

Stab Culture.—The line of inoculation is granulated. The whole presents the appearance of a nail with a very defined head, especially in gelatin culture (C). In this medium there is formed at the superior portion a distinct cloudy and dense circle. The color of the colony becomes in the course of time (one year) grayish, and presents a metallic luster on gelatin D. The head of the nail is less defined, and the color, which was grayish, becomes transparent pearl-white. There is no cloudiness through the thickness of the medium.

In gelatin B the head of the nail is less defined than in D, but as compensation there is a very thick cloudiness. In old cultures, one or two years old, on this medium the cloudiness becomes brownish at the center, corresponding with the point of inoculation, and it is sometimes very hard to go through it with the platinum wire.

On gelatin A no nail is formed. The growth takes place in the bottom, and without the formation of any cloudiness.

Smear Culture by Means of a Pipette.—Gelatin A colonies develop very slowly. It takes them two months to make their appearance. They are thick, adhere to the gelatin, and are of a porcelain white. Cloudiness appears about the second month after the first appearance of the culture.

Gelatin B—Growth very rapid; begin to develop after forty-eight hours. Colonies look creamy, but in reality are dry, and are easily separated from the surface of the gelatin, to which they scarcely adhere.

Gelatin C—Same phenomena.

Gelatin D—Appearance is greasy and thick. At the beginning is nearly invisible, becoming yellowish in the course of time.

Although glycerin is not considered among the group of nutritive materials used in bacteriology, we have made a trial on gelatin pepto-glycerized at one per cent. It was a long time before the colonies appeared,—eight months. At the beginning the color was the same as in gelatin D, but after three years the point of inoculation became entirely black. The odor of this tube, especially after a time, is something like that of carious dentin. In this case the culture developed in a splendid way, and had a thick and creamy appearance.

Serum—no growth.

Gelose—no growth, inoculation from the deep portion of a culture on gelatin did not give any result. The same with inoculation from bouillon.

Potato—no growth.

Action on Nitrogenous Substances.

Peptone—grows without the production of indol.
Albumin—grows, but does not dissolve it.
Milk—grows without changing it.
Urea—grows without marked fermentation.
Nitrates—no growth.

Action on Carbohydrates.

Glycerin—grows, slight fermentation.
Mannite—grows, slight fermentation.
Dulcite—no fermentation.
Erythrite, Arabinose—no fermentation.
Glucose, Galactose—slight fermentation.
Saccharose—very active fermentation.
Lactose, Maltose, Dextrin—slight fermentation.
Inulin—marked fermentation after forty-eight hours.

The liquid, when heated with Fehling's solution, gives, after cooling, a brownish-green color, while another tube under the same conditions gives an orange color.

Starch paste—no growth.
Pathogenesis—none.

Species No. II.

Micrococcus, very small, facultative aërobic, growing better in the absence than in the presence of air. Grows very slowly on gelatin, and if the Pétri dishes are used the colonies do not appear before the fifteenth to twentieth day. The gelatin is not liquefied, but becomes soft, especially in stab cultures. Particular characteristics, alkaline reaction of the bouillon after six months, and formation on the gelatin after a year of big crystals that we have as yet not determined. These crystals sink to the bottom of the tube after going through all the thickness of the gelatin. Grows better at incubator temperature than at ordinary temperature.

Gelose is a bad medium for the development of this species.

This species stains well with the ordinary staining reagents.

Bouillons A, B, C—Rapidity of growth B, C, A.

Bouillon B—The cloudiness appears after four hours; it has a silky appearance. The liquid becomes clear after ten to twelve days, and a finely granular deposit appears in the bottom of the tubes.

Bouillon C—Same phenomena, except that it takes longer for the liquid to clear.

Bouillon A—Same phenomena.

Trials were made on bouillon pepto-glycerized, and after inoculation a small fermentation took place.

Examination with the hanging drop preparation reveals a marked rotary movement for six to seven hours.

Gelatin.—Rapidity of growth B, C, D, A. This species grows very slowly in this medium. At the beginning the time required for this species to develop in this medium was one month; to-day it is three. The gelatin is not liquefied, but becomes semi-soft. The color of the colonies in the Pétri dish is first white, but as the colonies appear and develop near the surface they become greenish-white, round, with a depressed center.

Stab Culture.—Course of inoculation is granulated. The upper portion of the gelatin at the point of inoculation looks something like a nail. This corresponds to what later will become the dark portion of the colony.

The colony grows larger and sinks to the bottom of the tube in a V-shape form. The borders are greenish-white, and slightly indented. The central portion is dark. All around the colony and at the superior portion of the gelatin a cloud is formed something similar to the one observed in No. I. The crystals above referred to do not appear before a year.

These phenomena are the same for the different kinds of gelatin, except that the clouds and crystals are only found in the peptonized gelatins.

Smear Culture.—Growth very slow. The inoculation should be made by means of a platinum wire or a pipette. The appearance of the colonies is the same except for gelatin D, where they all look transparent.

Serum—Slight greenish-white appearance, culture very small.

Gelose—Growth very slow in occurring.

I, on Gelose B. After fifteen days, the colony appears like an accumulation of small spinning points.

II, on Gelose C. As a general rule after twenty days. No result on ordinary gelose.

Potato—Small whitish appearance after fifteen days.

These delays in development are a little lessened when the cultures are carried on in the absence of air.

Action on Nitrogenous Substances.

Peptone—grows, no formation of indol.
Albumin—grows without dissolving it.
Milk—no change is produced.
Urea—grows, slight fermentation during four hours.
Nitrates—no growth.

Action on Carbohydrates.

Glycerin—slight fermentation.
Mannite—no fermentation.
Dulcite—marked fermentation.
Erythrite—same phenomena produced.
Arabinose—imperceptible fermentation.
Glucose, Galactose—no fermentation.
Saccharose—no fermentation.
Maltose—marked fermentation.
Lactose, Dextrin, Inulin—no change.
Starch paste—grows without dissolving it.

Pathogenesis—produces when inoculated in small quantities in the white mouse and in the guinea pig abscesses of great size. General infection does not take place.

We wish to emphasize that this species, as well as Nos. III and IV, although it may seem extraordinary, causes a fermentation in urea. We must also say that fermentation takes place only in those tubes in which a small quantity of carbonate of calcium had been previously placed.

We hope to be able to return to this question for further discussion.

Species No. III.

Diplococcus, anaërobic facultative; grows better in the absence than in the presence of oxygen, and with greater rapidity at incubator temperature than at ordinary temperature.

Stains well with Gram's method and with Ziehl's carbolized fuchsin. With this preparation it is sometimes possible to detect a capsule which appears more plainly when examination is carried on in a hanging drop preparation.

Bouillons.—This species develops just as rapidly in any of the three kinds of bouillons that we have used (A, B, C). Cloudiness appears after four hours, just the same if the inoculation is made from a liquid medium or from gelatin. In the vacuum the cloudiness begins more rapidly, and is complete after two hours.

Bouillon A—Silky cloudiness in all the liquid. This begins to clarify at about the fifteenth day, and a gray filamentous precipitate is deposited in the bottom of the tube.

Bouillon B—Same cloudiness; fermentation lasts five to six hours. The upper part of the tube becomes perfectly clear at about the second month. No muco-filamentous precipitate is observed.

Bouillon C—A uniform cloudiness is present. A muco-filamentous and thick deposit is observed in the bottom of the tube.

These three bouillons become of an acid reaction at about the third month. If the species is examined with the hanging drop a very plain capsule is observed, and also a vibratory movement, which disappears after five or six hours.

Gelatin.—As we proceed in the culture of this species the development takes place with less rapidity, and the biological and pathogenic properties seem to have undergone marked modifications. Originally the culture of colonies carried on Pétri dishes of gelatin developed in forty-eight hours. To-day it takes eight days before they begin to appear. They have the appearance of white points, which become of a porcelain white as they approach the surface. They are uniformly round, and of button shape.

Stab Culture.—Fine granular appearance all along the course of inoculation. This begins to become visible at about the tenth day. Growth is as rapid in the presence as in the absence of oxygen. There is a difference in the appearance of the culture, according to the presence or absence of oxygen.

In the air colonies are of a porcelain white; do not have the nail form, but spread over the surface of the gelatin. Appearance after two months of a cloud just beneath the point of inoculation.

In the vacuum colonies are colorless, but of the same form, and have no cloud.

Gelatin B—(1) In the air the borders of the colonies are folded; they are of a grayish white; the central portion of a yellowish white. Cloudiness all over the gelatin. (2) In the vacuum central portion is yellowish; peripheral portion is transparent; presence of a cloud.

Gelatin C—(1) In the air same appearance as A, with the difference that the cloud is very slight and appears a little later, at about the fourth month. (2) In the vacuum uniform white porcelain spot, with borders cut out like clubs.

Smear Culture.—A colonies are of a creamy white appearance; develop in the air at about the fifteenth day, and in the vacuum from the eighth to the ninth day. No cloudiness appears in the gelatin in the air or vacuum. B colonies are greenish-white lengthwise; thick clouds appear in the presence or absence of oxygen. C, same phenomena as with stab culture. D, thick, creamy, transparent spot; cloud in the upper portion.

Serum—Delicate spot. Brilliant white color appears after six hours in incubator.

Potato—No appearance of growth.

Gelose A, B, C—Rapid growth; very plain after three hours. Colonies white and rounded.

Action on Nitrogenous Substances.

Peptone, Albumen, and Milk—no action.
Urea—very active fermentation.
Nitrates—grow, but without transforming them into nitrites.

Action on Carbohydrates.

Glycerin—growth, slight fermentation.
Mannite, Dulcite—very slight fermentation.
Erythrite, Arabinose—active fermentation.
Glucose, Galactose—very slight fermentation.
Saccharose—very active fermentation.
Lactose, Maltose—fermentation.
Dextrin, Inulin—slight fermentation.
Starch paste—no action.

Pathogenesis—Originally an inoculation in the leg of a white mouse of half a cubic centimeter proved fatal. At the autopsy this species was found in pure culture in the blood in the form of capsulated diplococci. This primitive virulence has become very attenuated, as the inoculation of the same species produces to-day only a bad, but transient, indisposition.

Species No. IV.

Cocci grouped in pairs, chaplets, or grapes. Aërobic facultative, with tendency to grow better at the temperature of the incubator (36° to 37°). In media kept in the air and at ordinary temperature the colonies grow with difficulty. They have a capsule which is difficult to observe under the microscope. They stain with all the reagents commonly used, the Gram method included. Peculiar phenomenon. Liquefaction begins now, after five years of culture, at about the fourth month, and progresses rapidly, while originally it did not begin before the eighth month. There is no cloudiness produced in the gelatin.

Bouillons.—Bouillons A, B, C inoculated with liquid culture, or with a particle of a colony from gelatin, become generally clouded after two hours. At the upper part of the liquid a dusty cloud is observed.

Bouillon B ferments actively, and presents after ten days, if the growth has taken place in the vacuum, a thick and marked creamy cloudiness.

It should be noticed that growth goes on with greater rapidity in the absence of air. When the growth is carried on in the presence of air a pellicle is formed on the surface of the liquid. After eight days the cloudiness has extended over the entire contents of the tube. In time it becomes clear, and presents a white filamentous precipitate, less marked than in No. III.

When this species is examined in a hanging drop preparation we observe a marked oscillating movement. The cocci may be grouped in pairs, grapes, or chaplets; they are very frequently found in the chaplet arrangement.

The reaction of the liquid becomes acid at the fifth month.

Gelatin—Stab Culture.—Growth did not appear before the third month; had the form of a delicate and white semi-granular spot. The appearance is something like that of No. III, although less white. The liquefaction begins at about the fourth month. The gelatin while liquefying does not have the form of a funnel, as it generally does with other species. The gelatin shows no cloudiness, and is kept clear even after total liquefaction.

In striæ the colonies take the same time to appear. They come in the form of small round and white colonies, which cause the gelatin to bulge out before liquefaction takes place.

Gelose—This is the best solid medium for the culture of this species. On gelose A the growth begins after four days, while on gelose B, and especially on gelose C, a trace of growth is apparent after two hours. This trace is of a whitish blue, and the colonies are round.

Serum—a small white spot after six hours.
Potato—nothing.

Action on Nitrogenous Substances.

Peptone—grow without the production of indol.
Albumin—grow without dissolving it.
Milk—grow well; milk transformed into a yellow liquid of disagreeable odor.
Urea—grow very well and cause active fermentation.
This property so well developed at the beginning tends now to disappear.
Nitrates—grows and transforms them into nitrites by means of Griess's reagent.

Action on Carbohydrates.

Glycerin—slight fermentation.
Mannite—active fermentation.
Erythrite—marked fermentation.
Arabinose, Glucose—grows without fermentation.
Galactose, Maltose—imperceptible fermentation.
Saccharose, Lactose—no growth.
Dextrin, Inulin—slight fermentation.
Starch paste—no growth.
Pathogenesis—kills mice in twenty-four hours, and is found in pure culture in the heart and lungs.

Species No. V.

Bacillus, with a marked tendency to grow better in the absence of oxygen. Just as species Nos. III and IV, this species prefers the temperature of the incubator to the ordinary temperature. It stains well with the ordinary staining reagents; it also stains with the Gram method.

Bouillon A—A uniform cloudiness sets on after twelve hours; a sticky deposit is formed after two or three months.

Bouillon B becomes clouded in the same time; presents a cloud in the upper, fermenting part of the liquid, and never clears.

Bouillon C—Same phenomena as with A, with the difference that the deposit is a great deal more sticky and compact.

When a hanging drop preparation is examined the bacilli are seen grouped in pairs or chaplets; slight rotary movement.

Gelatin.—If the growth is carried in Pétri dishes the colonies have an oval form and a yellowish color, and begin to appear after forty-eight hours in all new cultures. The appearance of these colonies is now greatly delayed. It takes fifteen days before they begin to appear. These colonies are not liquefacients.

At full growth these colonies have a round form, with white, irregular borders, while the central portion, which is the most elevated, is dark yellow. No cloudiness is present.

Stab Culture.—Rapidity of growth B, D, C, A.

The course of the inoculation is uniform, and has the appearance of a nail without a head. No cloudiness takes place. The colonies begin to appear at about the fifteenth day. They present the same peculiarities as when growth is carried in Pétri dishes.

Gelose—Rapidity of culture C, B, A.

On gelose C, after six hours it is possible to distinguish a growth which reflects rays of brilliant rainbow colors. After twenty-four hours the growth becomes thick and granular, and the refraction disappears. On gelose B the phenomena are the same, except that the colonies are thicker and larger.

On gelose A—no growth is produced.

On serum—a slight growth of fish-scale appearance (after forty-eight hours).

Potato—no growth.

Action on Carbohydrates.

Glycerin, Erythrite, Arabinose—no growth.
Mannite, Glucose, Inulin—imperceptible fermentation.
Maltose—no growth.

Action on Nitrogenous Substances.

No fermentative action; growth takes place nevertheless on these media, except on starch paste.

CONCLUSIONS.

We can see from the characteristic properties that we have noted that the species that we have studied have never before been described. To consider them specific microbes would be contrary to our ideas. We only wished to describe them, reserving the right to study them again until we should be able to identify them with some other species that are found in the oral cavity, and as conclusion we will say that:

1. There is not, properly speaking, a specific microbe of dental caries. The species that are found in the deeper layers of the dentin are merely ordinary species, more or less pathogenic it is true, but all have their origin in the oral cavity.

2. These species are less frequent in the deeper portions of the tubuli, because of a microbic antagonism or of their facultative anaërobic property.

3. The destructive process of caries may take place under good fillings of whatever material after the lapse of a long time.

4. The experimental reproduction of caries on a living animal is to-day a demonstrated fact. It was produced with a microbic species taken from under a good filling seven years old.

5. It is possible that there are certain micro-organisms which will dissolve healthy dentin without themselves being liquefying agents of gelatin and serum.

THE ADMINISTRATION OF ANESTHETICS IN DENTAL SURGERY.

BY S. ORMOND GOLDAN, M.D., NEW YORK, N. Y.

(Read before the New York Odontological Society, May 15, 1900.)

FROM time to time since the discovery of nitrous oxid, ether, and chloroform efforts have been made to find a safer anesthetic. It may be questioned whether a greater safety lies in the discovery of newer agents rather than a more proper knowledge in the use of those at present employed. Operators the world over are realizing more fully every day that it is not so much the anesthetic itself as the administrator in which not only the greatest safety, but superior results lie. Recently there was introduced a mixture of anesthetics, which was used quite extensively in surgery, and to some extent in dentistry. Its so-called great advantages were its safety, rapidity in action, quick return to consciousness, and absence of after-effects. Evidently few knew that with ether properly administered all the advantages claimed for the new mixture could easily be secured. In fact, more so. This simply depended upon the nature of the operation, the method employed in inducing narcosis, the profundity of and length of time in maintaining it. I might say this mixture of anesthetics is very rarely used at present. I believe the best results in dental, as in general surgical, work do not lie in the use of any one anesthetic to the exclusion of all others, but in a variation in the anesthetic and methods employed, according to the nature of the operation and peculiarities in the types of patients. While nitrous oxid, ether, and chloroform all have their place in dental surgery, nitrous oxid is, and has been, more generally useful, because of its rapidity in producing narcosis and quick return to consciousness. But this also has its disadvantages, in obliging the operator to work rapidly, and so restricts the use of this anesthetic almost exclusively in dental surgery to the extraction of teeth.

The routine use of anesthetics in the longer and painful dental operations has never been attempted, for the reason that the operator cannot administer the anesthetic and operate at the same time, except for extractions, where the available working time lasts only from the removal of the face-piece to the return of consciousness. To give nitrous oxid in long surgical operations, as compared with oral work, is easy, for here the inhaler may be applied as often as necessary with little discomfort to the surgeon; whereas in dental work it necessitates constant interruptions and loss of time to the operator, which constitutes one of its greatest drawbacks.

Many plans have been advocated for prolonging the anesthesia with nitrous oxid; the most common in dental work in this country is mixing directly with the gas, chloroform or ether in variable quantities, the so-called "vitalized air." In my estimation there is no surer method for devitalizing the patient. I consider this mixing of chloroform vapor with nitrous oxid gas doubly dangerous. First, because chloroform is mixed with a deoxygenating agent, and second, it is given in the sitting position, of which I shall have more to say presently. I very seriously question whether anesthesia can be prolonged by this method more than with gas alone, properly used. That the method has been used many times with no mishap does not excuse its use. The most dangerous methods might be employed in many instances with no untoward results. The method should be condemned. Another plan is to give the gas through the nose and mouth. This does prolong the narcosis an appreciable time. Another method is to give the gas very slowly, consuming five or more minutes in the narcosis. By this plan consciousness is not quite so quickly regained. It should be remembered the desire to prolong nitrous oxid anesthesia has been only in connection with tooth-extraction. As you no doubt know, the general surgeon will often give an anesthetic to open a simple abscess, or for the removal of sutures. Is it not a remarkable fact that that most painful of all operations, the grinding out of a tooth preparatory to filling, with other painful dental operations, has been, and continues to be, done, and the patient obliged to submit to it? There is certainly no more painful operation in surgery. Again, why is so much time consumed in treating a root and preparing the tooth for filling when this, the extraction, if any, the preparation for filling, and any other painful oral work could easily be done in one seance, leaving the filling and other unpleasant, but not actually painful, work to be done at subsequent intervals? Where it takes days and weeks to prepare teeth for filling, it could all be done in a very short time with no interruption to the surgeon, and thoroughly, with the consciousness of having left nothing undone, which no doubt, in spite of every effort, does occur as the result of the inability of the patient to endure the suffering. A good plan, I think, would be to designate by diagram the teeth requiring filling, and also any other painful work; the patient might be anesthetized and all this done at one sitting. I think the time is not far distant when no patient will be expected to submit to this torture, any more than in general surgery work.

Efforts have been made to eliminate the painful procedures in dental practice by the use of local anesthetics. These have not proven successful, and evidently nitrous oxid has not proven itself an entirely satisfactory anesthetic. While we are told of the thousands of times it has been used (which was principally for extractions), we are not told how often the gas has proven unsatisfactory, and many times failing entirely. While it is well known that nitrous oxid gas and other anesthetic vapors are heavier than air, the practical application of it in dental surgery is, I think, original with myself. This method consists in administering the anesthetic continuously, with no interruptions to the operator. This I have designated, in the absence of a better term, the gravity method. The first two cases anesthetized by me in this manner were, first, the preparation of two teeth for filling; the second, removing a molar and opening the maxillary sinus and removal of some necrosed bone. In both cases gas was administered continuously. There was no cyanosis, stertor, or jactitation, and consciousness was immediately regained.

We may consider the use of nitrous oxid alone, or with carbon dioxid, with oxygen, with atmospheric air, with ether, and with chloroform. As you are all familiar with the use of nitrous oxid as ordinarily administered, I shall simply mention some salient points in connection with it. While the apparatus can never make the anesthetist, the perfectly working appliances will certainly conduce to the best results. When we examine the rather cumbrous apparatuses generally used in this country for administering nitrous oxid we find little improvement over those of years ago. The stopcock, for instance, works in two ways, and there is no means of administering ether with gas except to change inhalers. A great defect is the long piece of tubing connecting the gas-bag with the face-piece, causing an undue stress on respiration. Compare this with the simple, portable, durable, and inexpensive device of English manufacture, which leaves little to be desired. Ether can be given without changing inhalers, and, if necessary, it may be arranged for the patient to breathe back and forth into the gas-bag. In order to secure best and always satisfactory results, the proper mouth-prop should be selected for each case, and so arranged that it may be in position before the inhalation begins. No single mouth-prop will answer for all cases. They should be of different sizes and rigid. A suitable lip-retractor may be applied, materially helping the operator. When work must be done on each side, the prop should be adjusted to the opposite side before withdrawing the other. To obviate the falling backward of fragments of teeth, etc., into the larynx a small piece of wide-mesh gauze should be placed at about the middle of the dorsum of the tongue and separated. This makes, as it were, a hammock to catch all foreign particles. While it is not essential for simple extractions that patients abstain from food for some hours before taking gas, it should be insisted upon where it is intended to administer the anesthetic repeatedly. When more than one application of the mask is necessary, the patient should not be permitted to regain complete consciousness before readmitting the gas. Loose clothing, removal of corsets and all impediments to respiration, absolute quiet, and a third person present always are essentials, I think, well known to all.

The use of nitrous oxid with carbon dioxid.—This method can be applied with an apparatus without valves. The one I show was devised by myself; is extremely simple. By this method the patient breathes back and forth into the gas-bag. The carbon dioxid is produced during the respiration, and consists in amount equal to that of the oxygen in the blood at the time the inhalation was begun. Where there is not sufficient gas on hand to bring a narcosis to a successful termination, the method may be employed and found useful. It may also be used generally in place of the regular nitrous oxid inhaling apparatus.

The method of using oxygen with nitrous oxid is certainly an improvement over gas alone. This eliminates all the unpleasant features of nitrous oxid. The pulse, respiration, and pupil remain approximately normal, and cyanosis is eliminated. The apparatus shown is Dr. Hewitt's, of London. Oxygen is given in quantities varying from about two to twelve per cent. The combination is particularly useful in delicate types, though often it acts as well in plethoric patients. The method at present is not applicable for the longer narcosis in dental work, because it cannot be given continuously. In general surgery, where the inhaler is constantly applied, it acts particularly well, and has been administered by me many times, the longest anesthesia lasting two hours and forty minutes. For simple extraction purposes the narcosis lasts fully as long as with gas alone. Sometimes the available operative period is appreciably prolonged.

We may now consider the use of anesthetics in the longer dental operations, where any work, long or short, may be performed with no interruptions to the operator. This brings us to the use of nitrous oxid, ether, and chloroform by our gravity method.

Nitrous oxid and atmospheric air (diluted oxygen) continuously administered.—For this purpose the apparatus devised by me is most applicable. The patient should be in the semi or preferably the recumbent posture. Here the inhaler is applied to the nose at about its middle and tilted upward. The gas reaches the patient by its own weight, falls around the nares and into the cup-shaped oral cavity. The patient can be given as much or as little gas as is desirable by letting it flow continuously or not. When air is required, the obturator in the apparatus may be closed and the gas entirely shut off.

It may be argued that the recumbent position is not practicable for the dental operator. I think this objection is more apparent than real. There is really no reason why the dental surgeon cannot do his work as well with the patient in the recumbent position as does the general surgeon. When the sitting posture is absolutely essential, or where the method does not act satisfactorily, ether may be employed. There is no serious objection, there being no contraindication to the employment of ether in the sitting position. The anesthetic is best employed by first anesthetizing the patient with gas, then discontinuing the gas slowly and giving ether gradually, so that by the time the gas has entirely passed off the patient is etherized. The anesthetic is then employed by the gravity method, by giving it from a mask or inhaler applied to the face about the middle of the nose.

The apparatus for giving gas and ether shown is the Barth-Clover, of English make. This appliance is not only the most efficient of the valve apparatuses; it is also the least expensive, even after adding an import duty of forty-five per cent. The inhaler without valves may be employed, first anesthetizing the patient with gas, then quickly inserting the basket with the gauze saturated with ether. After the patient is etherized the inhaler may be tilted and the anesthetic administered this way, or the mask before mentioned may be employed.

Chloroform.—This anesthetic is the last to be used in dental surgery, and should only be employed where there is a condition of the patient contraindicating gas or ether. Any condition where an increase in arterial tension is undesirable indicates the use of chloroform. These are principally diseases of the circulatory system, as arteritis, atheroma, aneurism, myocarditis, etc.; also in marked renal diseases chloroform acts better. Where gas and ether is not well taken, chloroform may be used. Chloroform should never be directly given to excessively nervous patients. Here gas may first be employed, then ether, to be followed by chloroform. Again, chloroform should never, under any circumstances, be given in any but the recumbent position; nor should the person after anesthetization be changed to the sitting posture, as this may easily lead to syncope. It is a singular fact that the larger proportion of chloroform fatalities occurred before either the patient was entirely anesthetized or the operation begun. And many of these deaths took place in the dentist's chair for simple tooth-extraction, the patient being in a sitting position. Chloroform is a vaso-motor paralysant; the recumbent and inverted position tends to a certain extent to overcome a fall in blood-pressure. The sudden change from the recumbent to the sitting posture probably accounts for many deaths from this anesthetic. For any dental work which cannot be done with the patient in the recumbent posture another agent should be used for anesthesia. Again, no operation, and particularly those of a dental nature, should ever be begun until the patient is thoroughly under the influence of chloroform. With gas and ether the lighter degrees of narcosis very often answer, whereas with chloroform it is particularly essential that all nerve influences be completely abolished to avoid abnormal reflex action. It is said the fifth pair are particularly prone to influence the heart deleteriously and often fatally through vagi, in the lighter stages of anesthesia by chloroform. I think this only partly explains it. There are also, probably, direct reflex influences upon the vaso-motor centers in the medulla. At the same time chloroform causes a direct dilatation of the vessels themselves. After the patient is anesthetized the anesthetic may be administered through the nares by means of a soft-rubber catheter, or directly through the mouth by means of a metal tube, or a simple mask may be used and the anesthetic given by the gravity method.

In bringing our discourse to a close we may make a few deductions regarding fatalities. These may be, first, due to improper preparation of the patient, faulty selection and administration of the anesthetic; second, from the anesthetic itself, every precaution having been taken (these are the cases only which should be termed "unavoidable"); third, from some abnormal peculiarity, discoverable or undiscoverable (naturally, if known, it would possibly be avoidable; those should more properly be considered under the first heading) ; fourth, from hemorrhage, shock, etc., early or late in the narcosis (this differentiates deaths from anesthetics from those while under the influence of them) ; fifth, coincidence ; that is, that the patient would have died at or near the time the anesthetic was administered. Some cases have been reported where death suddenly occurred just before the administration, and these have been termed fright. Coincidence is certainly the rarest of all conceivable contingencies, and I should not mention it at all had I not a most remarkable case to report. This was a patient with marked cardiac disease. A physician in attendance intended to administer chloroform to open a superficial alveolar abscess. When he reached the top of the stairs the nurse suddenly came from the patient's room, telling him the patient suddenly died a moment before. Had he been a few minutes earlier and commenced the administration of the anesthetic I think nearly every one would say the patient died from chloroform. This is certainly an extraordinary occurrence. To those who would explain this as fright I might say the patient was unaware that an anesthetic was to be administered, so had no reason to be frightened. Again, to those who assert that syncope is always due to overdosing, it may be said this patient had an overdose of nothing.

This, gentlemen, brings our paper to a close. Many things mentioned have been familiar to you all. I think you will all agree that no practical facts ever lose anything by repetition.

ANTISEPTIC SURGERY OF THE MOUTH AND FACE.

BY W. H. G. LOGAN, D.D.S., CHICAGO, ILL.

(Read before the National Dental Association, July 10, 1900.)

If you please, let us first take under consideration the steps necessary to gain and maintain an aseptic wound about the face. The part needing surgical interference should be first shaved, then scrubbed with a stiff nail-brush and green soap ; then cleansed with a two per cent. carbolic acid solution, and lastly bathed freely with absolute alcohol ; the patient being previously anesthetized and hair so bandaged that the surgeon cannot get his fingers or instruments in contact with the part, and as a result infect the wound. If during the operation the patient vomits, the wound and the field about should at once be covered with gauze, which is not removed until the parts beyond the surgical field have been made aseptic again. The nausea subsiding, the protecting gauze is removed and the operation finished. The wound is irrigated with a one per cent. carbolic acid solution, and followed by a saturated solution of boracic acid ; care is taken that all free pieces of tissue, bits of cotton, or tents of gauze are carried away during the process of irrigation. Hemorrhage in this field can as a rule be best controlled by torsion. In case this fails ligate with catgut. Never use a powdered styptic to control hemorrhage which occurs in an aseptic wound ; it will prevent union in the parts by first intention. The employment of tampons passed from boiling water to the wound will control the hemorrhage you have occasion to treat about the mouth and face very satisfactorily in a majority of cases, with the pleasant after-result of but slight wound inflammation. You may now close the wound by the employment of horsehair or silk and catgut sutures, the catgut only to be employed where the wound is very deep. I do not believe it wise to rely upon buried sutures alone in the treatment of wounds about the face, but always use a few horsehair or silk sutures to insure constant coaptation of the edges. Care should be taken that these sutures are not drawn too tight, for the result would be stitch abscesses.

Let us now pass to the dressing of this aseptic wound of the face. Questions of importance are, Should it be a moist or dry dressing? How secured to the part? and period of time dressing is to be employed. Answers: A dry dressing, and secured to the part by the use of flexible collodion to the dried tissue. This dressing is kept in position from five to twelve days, dependent upon the tension about the wound. To prepare the surgical field for its dressing after the sutures are in position, dry the parts and dust thickly over the sutured line with powdered boracic acid, which is then moistened with alcohol. The powdered boracic acid will, as the alcohol evaporates, practically hermetically seal the exposed edges of our aseptic wound. Now place a few layers of gauze, to be held secure by bandaging where the part will allow. More frequently, however, it will be found necessary to place a fold of absorbent cotton over the layers of gauze, and secure this to the dried tissue by the means of flexible collodion and adhesive plaster strips. The dressing is not to be disturbed without good cause until the stitches are to be removed, which is from the fifth to the eighth day, after which the surface is again prepared as before and a similar dressing replaced for a period of four days, to allow of closure by granulation of the openings caused by the removal of the sutures. Always employ the dry dressing for all aseptic wounds of the face, for the reasons that with a dry dressing you can practically hermetically seal the wound by the procedure spoken of; secondly, because the bacteria brought in contact with the wound by the air cannot propagate without moisture.

We shall now pass to the consideration of the probability and possibility of gaining and maintaining such a condition of a surgical wound in the oral cavity after an operation that infection will not take place from the pyogenic bacteria ever present in the fluids of the oral cavity. Although a quarter of a century has elapsed since the value of aseptic and antiseptic methods of general surgery were brought forward, the benefits derived from following these principles in the treatment of external wounds can be found detailed in all text-books of surgery of recent date, while the methods and procedure necessary to gain and maintain a condition in and about a surgical wound of the mouth are dismissed with but a line or so, if even spoken of.

What precautions should be taken to prevent the proliferation of the bacteria which are present in the saliva that bathes the wound constantly? This fluid is ordinarily alkaline or neutral, a perfect medium for the growth of the streptococci and staphylococci, which are the main pus-producing germs found as a rule in this field. Cannot the proliferation and activity of these pyogenic germs and their dire effects be best prevented in this field by changing the normal secretions from alkaline, or by producing a condition which will prevent the development of these bacteria? If we can by any harmless method maintain a mild acidity of the fluids which bathe the surgical wound of the mouth without toxic effect, will we not gain asepsis of the oral cavity by the presence of free oxygen upon the wound's surface?

With the hope of changing the alkaline condition to one of acidity, the powdered acetate of potassium was dusted on the surface of wounds made in the mouths of two dogs for experimental work, with the idea that the salt would decompose and thereby leave liberated acetic acid on the wound surface. The wounds thus treated healed without undue inflammation. No infection occurred, and the wounds looked fresh and clean at each application. The wound of dog No. 1 healed in nine days; of dog No. 2 in ten days.

We experimented also on two dogs with similar wounds in the cheek with the Bacilli acidi lacti. The wounds were dusted with this bacillus for the purpose of having ever present over the wound surface a slight acid secretion. Sugar was used with the bacteria merely to dilute it. These wounds healed a trifle slower than those upon which the acetate of potassium was employed, but healed in eleven days. The discharge of secretion was rather pronounced, yet no infection took place. The wound was ever fresh and clean at the various applications.

In the next two dogs, under experiment with like wounds, oxychlorin was dusted over the part with the hope of having oxygen liberated constantly on the wound's surface, which would prevent the development of bacteria. The oxychlorin treatment in case No. 1 did not prevent the formation of pus; a slide made during the second day showed the presence of streptococci and staphylococci. Yet the infection lasted only two days, while the wound healed in ten days without the formation of scar-tissue. The second dog's wound, from like treatment, healed in nine days, and showed a beautiful clean surface at all times. The various wounds were treated three times daily.

This experimental work was carried further by again making like wounds in length and depth in the mouths of these dogs and infecting them with a virulent culture of Staphylococcus pyogenes aureus. The wounds were not treated until the next day, to allow perfect opportunity for the growth of the bacteria.

The wounds under the treatment with oxychlorin showed on the second day of treatment inflammation and a great quantity of pus, while the slide made showed the presence of staphylococci. The inflammation did not cease increasing until the ninth day of treatment had passed, though the pus began to decrease at the end of the seventh day, ceasing in ten days more. The dogs under oxychlorin treatment had to be fed upon a bread and milk diet for twelve days, as a result of the great inflammation in the cheek tissue.

In the cases where potassium acetate was employed the inflammation and infection increased for a period of five days only, yet the slides made showed the same infection as in the preceding case. The inflammation and pus secretion practically ended after eleven days; infection controlled in fourteen days.

Reviewing the experiments where the wounds were infected with the same virulent culture of Staphylococcus pyogenes aureus, the slides made the following day showed the same infection. These wounds were dusted on the following day with another culture of bacteria, using the Bacilli acidi lacti and sugar. Slight inflammation about the wounds' edges appeared during the fourth day; the afternoon of the fifth day the inflammation began to increase, and continued to increase slowly for three days. When eight days of treatment had passed the inflammation and infection were rapidly subsiding, and on the morning of the tenth day a fresh, clean surface was presented, with but slight oozing of secretions; and slides made on the evening of the eleventh day of the wound that had been dusted with the lactic acid-producing bacillus showed the wound to be free from infection, and healing kindly.

The wounds which were infected with the pus-producing germs and treated by oxychlorin, potassium acetate, and the lactic acid-producing bacteria (Bacilli acidi lacti), showed, in brief, the following conditions:

Under oxychlorin the infection was controlled in seventeen days; pronounced inflammation present, fourteen days; pronounced swelling present, twelve days; bread and milk diet, twelve days.

Under potassium acetate, infection was controlled in fourteen days; pronounced inflammation present, six days; pronounced swelling present, four days; soft food as diet, four days.

Under Bacilli acidi lacti and sugar, infection controlled in eleven days; pronounced inflammation not present; pronounced swelling not present; regular diet throughout.

We are led to assume that the reason that wounds under treatment with the lactic acid-producing bacillus and acetate of potassium did so well was because we were able by this procedure to create and maintain more constantly over the wound surface a slight acid condition instead of an alkaline or neutral one.

In closing, I wish to say I shall carry this experimental work further on similar grounds, including the treatment of the pus-pockets and suppurative conditions which we frequently find about the roots of teeth, using potassium acetate and the lactic acid-producing bacillus to see if we cannot control more quickly the infection in these parts.

A METHOD OF PREPARING DISTAL CAVITIES IN CUSPIDS.

BY DR. E. K. WEDELSTAEDT, ST. PAUL, MINN.

(Read before the National Dental Association, July 10, 1900.)

PROLOGUE.

MR. PRESIDENT AND GENTLEMEN: The essay which I shall read for your consideration was written in August, 1899. When it was finished I desired some data regarding the method of right-angle anchorages for approximo-incisal fillings. As the late Dr. Geo. H. Cushing was the first to call my attention to the necessity of using such an anchorage for these fillings, I wrote him for data, and asked that he take part in the discussion of this essay. Dr. Cushing wrote, "For thirty-five or more years I have used a right-angle anchorage in central incisors for approximo-incisal fillings. In fact, I feel as though I had always used it, for it is the only rational anchorage to use for these fillings." He could not or would not tell me who originated this method. This latter information I was most anxious to obtain, for the reason that Dr. Cushing had prepared and sent me a cavity in an extracted central incisor which illustrated the method to which he had called my attention. The tooth with the prepared cavity I had used in instructing other practitioners, and these called this manner of preparation "the Cushing method." But on May 25, 1900, this mighty man closed his chapter, and thus the data which I wished must be obtained elsewhere. I have never heard of applying this method to distal cavities in cuspids, nor did Dr. Cushing or anybody else suggest it. So far as I know, attention has never been called to applying this method to cuspids.

Before I read my essay, I wish to say that with the death of Dr. Cushing the dental profession has lost the greatest teacher of operative dentistry that the world has ever known. He was to operative dentistry what the renowned Dr. Black is to pathology, without a peer.

Dr. Black once said to me, "When Dr. Cushing finishes a filling nothing remains to be done." What more can be said?

I trust a movement will be inaugurated by the members of this society that will have for its end the erection of a suitable monument to the memory of this great man. Surely his work for the benefit of our profession deserves some recognition from us.

A METHOD OF PREPARING DISTAL CAVITIES IN CUSPIDS.

Until five years ago many difficulties were encountered whenever it was necessary for me to fill a cavity in the distal surface of an upper left cuspid. Beginning in 1885, an effort was made to obtain a more simple preparation for these cavities. Older operators were continually questioned regarding their methods. Some of their methods were tried, but discarded, as they were lacking in some fundamental principle.

Somewhat over five years ago I applied the principles of a right-angle anchorage to one of the cavities in this tooth. The results were most satisfactory. From that time to this I have applied the same method of preparation to a large number of these cavities. When an invitation came for an essay to be read to your members I consulted some of the men in Minnesota who are familiar with this method, both by study and practice, and it was thought best that your attention should be called to it. What is said in this essay relates to making permanent work for patients who are more than eighteen years of age.

Fig. 1 is that of an ordinary-shaped cuspid. Where there is a cavity in the distal surface of such a tooth it is prepared the same as an approximo-occlusal cavity, by shortening the distal cutting-edge and making a substantial step. An incisal anchorage is then made in the main body of the tooth. The dark portion in this illustration represents a labial view of one method of preparing these cavities, which I have made use of in the past and which I still use. The lined extension illustrates another method that was in use for some years, but which was given up on account of the difficulty of making and securely filling the retaining pit toward the incisal. The dotted lines show to what extent the tooth can be shortened to obtain a step and incisal anchorage.

FIG. 1.

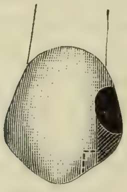

FIG. 2.

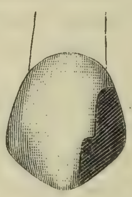

Fig. 2 represents a labial section of the tooth with the filling in position. The method is so simple that it is not necessary to go into detail.

The same principles that are used in filling mesial and distal cavities in bicuspids and molars are applicable to these operations. The occlusion of the teeth should be studied, so that we may obtain adequate ideas of how much stress a filling in this position will be compelled to sustain. The size of the step at the incisal must be governed by the occlusion of the teeth. The anchorage pit should be made in the dentin. The seat of the gingiva should be broad and flat. Extension for prevention must be fully carried out, so that when the filling is completed there will be no "retention centers" to hold the food.

ARGUMENT.

On looking at the labial surface of cuspids we shall find a prominent ridge. This is known as the labial ridge, and it is higher than any other part of the tooth. The enamel slopes away to the mesial and distal from this ridge. Any filling, therefore, which is placed in the distal surface of an upper cuspid is not likely to be seen by a person who stands in front of the patients for whom these operations have been made. On this account esthetic principles, and those also of conserving tooth-substance, need not be given that consideration which would be necessary if the cavity were differently situated.

Where these principles are applied a cavity of the greatest simplicity is the result, consequently each step of the operation can be carefully considered as the work progresses, and failure should not result if the requisite care has been given to the work. I have yet to have my first failure.

For a number of years a few have contended that the more simply cavities are prepared, the greater the chances for making more perfect work; that deep and inaccessible retention pits increase the chances for making imperfect work and having failure later on. I believe that the largest number of failures in fillings (in proportion to the number of teeth filled) occurs among distal fillings in upper left cuspids. The causes of these failures are known to me. I am not here, however, to discuss the conditions that lead up to this state of affairs, but rather to call your attention to this simple method of preparing these troublesome cavities. By following it failure should not be so likely to take place, as the entire operation is reduced to one of extreme simplicity.

Where these principles of cavity preparation have been applied it has taken but ninety minutes to prepare and fill the cavity and finish the filling. It may be well for us to think over this saving of time.

The gingival third of a number of these cavities has been filled with non-annealed gold, according to the method illustrated in the 1891 DENTAL COSMOS, page 537, to which attention has been called by Dr. G. V. Black.

In conclusion, I desire to say that within the past six months I have attended a few dental meetings, where I have had the pleasure of advancing the teachings of my master. At one of these meetings a man, supposedly a dentist, arose and asked, "Did not the men practicing dentistry forty years ago save teeth?"

"They did," was the answer.

He then replied, "Well, if they did, the methods and principles used then are good enough now."

This essay was not written for the dentists who are believers in such obsolete principles. It was written, however, for those who are dissatisfied with the present method of preparing these cavities, and who, like myself, have sought for something better.

I trust the ideas I have presented for your consideration are new, and of some worth to those who have been and are still seeking a more simple way to prepare distal cavities in cuspids.

TREATMENT OF ACUTE AND CHRONIC ALVEOLAR ABSCESS.

BY JOSEPH E. WILKINSON, D.D.S., L.D.S., PETROLIA, CAN.

(Read before the National Dental Association, July 10, 1900.)

AN abscess is the result of death of the pulp which has been invaded by pathogenic germs; decomposition and fermentation take place in the root-canal, degenerating into a condition of purulency, with the resulting development of gases. Heat causes expansion of the gases; this expansion causes pain through pressure on the nerve-filaments at the apex, inflammatory action results, and all the indications of apical pericementitis are present. These inflammatory disturbances cause the tissues covering the root to assume a dark red or purple color.

If this condition goes on unchecked the formation of pus ensues; a destruction of cellular tissue goes on in all directions. There is increased soreness; the gum, a dark red, now assumes a tumid appearance. In the more advanced stages there are signs of swelling to a great extent; a general rise in temperature and fever are frequently manifested. This inflammatory action goes on in the adjacent alveolar tissue until the pus finds exit, which is usually at a point of least resistance, and we have all the conditions of an *acute abscess.*

When the fistula is formed the inflammation subsides. When these pathological conditions exist for a considerable period of time, involving the infiltration of some portion of the alveolar process with purulent matter, and where the abscess has not been of such an active character as to cause the formation of a fistulous opening, it usually becomes *chronic,* and may become confined in a sac or enlarged pocket in the apical region or at a considerable distance from the apparent seat of origin, and which is usually known as blind abscess.

Treatment.

1. Abortive. When the case presents itself in its early stages, so that this treatment can be used, remove the cause. Open and cleanse thoroughly the canals to the apex. Apply aconite and iodin to the gum; internally administer quinin.

2. Favor pointing of the abscess if above methods prove unavailing by local stimulation, capsicum plasters, etc.

3. Surgical.

First. When an abscess is suspected, after adjustment of the rubber dam secure such a drainage through the root-canal that no stoppage can prevent the free evacuation of the pus. An opening should be made through the pulp-chamber in such a position as to enable the operator to obtain direct access to the roots, and a sufficient amount of tooth-structure cut away so that operating in the root-canals can be done if possible on a line parallel to the direction of the root. The canals should then be opened up and contents thoroughly removed with flexible drills, except in cases where the roots are crooked, rendering perforation likely, and those in which calcification may have taken place. In tortuous canals access to the end of the root can usually be obtained in most cases by a fine, flexible probe lubricated with a drop of oil of cinnamon or carbolic acid. The operator should be guided by his own judgment as to the method he should pursue in each case which presents itself. Great care must be taken not to force any of the septic matter through the apical foramen.

Rinse thoroughly with peroxid of hydrogen through root-canals;

force it through, persisting till effervescence ceases, then wash out with absolute alcohol and dry with hot air and electric canal-drier. Now inject any powerful antiseptic, as carbolic acid, and again dry thoroughly; then place loosely in the canal absorbent cotton saturated with oil of cinnamon. Seal the pulp-chamber with gutta-percha and dismiss patient for a week. When the patient reports complete comfort the dam is again adjusted, the dressing removed, and the treatment repeated. The canals are now filled. In such cases chloro-percha makes an ideal root-filling, being very permeative, depending on the degree of consistence.

Some of the canals are very fine, and, as the future success of the operation depends largely on the thorough filling of the canal to the apex, to fill them with this solution seems practical. The solution can be carried to the canals with a small broach having a few fibers of cotton wrapped about the end and pumped to the apex. After the canals are full of this thin solution, thicker gutta-percha is pressed in until there is no doubt of the fluid having gone to the apex. Care should be exercised in doing this, and the patient should be instructed to respond to the first sensation.

In treatment of chronic alveolar abscess, with or without fistula, thorough drainage must be secured; the contents of the root-canals thoroughly removed as previously described, and syringed out with a solution of bichlorid of mercury, followed by a strong solution of pyrozone. If a fistulous opening exists, force the pyrozone through. The canal is then dried thoroughly and oil of cinnamon pumped in, a loose dressing of cotton being placed in canal and sealed with gutta-percha. This treatment must be repeated at intervals of from seven to ten days, until all inflammation has subsided. Then treat as before, and fill with gutta-percha.

In cases which do not respond to ordinary treatment, extraction and replantation should be resorted to. This method of treatment is indicated in (1) roots of teeth the ends of which have become necrosed through persistent alveolar abscess; (2) in teeth where part of a broach protrudes through the end of the root and cannot be removed; (3) teeth in which calcification has taken place, rendering thorough treatment doubtful; (4) perforation of the cementum through any cause; (5) in teeth where canals are too tortuous to permit of proper cleansing. In nearly all these instances persistent abscesses will be the ultimate result.

The tooth should be extracted carefully, so as not to injure the pericementum or check the enamel. Immediately after extraction the tooth should be immersed in a bichlorid solution, and all the affected portions removed. At the same time the socket should be thoroughly syringed out if pus be present, and all antiseptic precautions taken; after which the sockets should be packed with gauze dipped in antiseptic solution until the tooth is ready for replacement. It is often desirable to cut off about a sixteenth of the end of the root, thus leaving a slight space for blood which will accumulate at the apex in forcing the tooth to place. The canals should be opened up and treated and filled as previously described.

After the tooth is replaced it must be held in position firmly by ligatures, or by an appliance constructed from an impression taken previous to extraction. I have resorted to this plan in many instances in which no other method seemed available.

THE EVOLUTION OF THE COMPLEX MOLAR FROM THE SIMPLE CONE.

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the National Dental Association, July 11, 1900.)

No branch of human phylogeny has been so completely and beautifully worked out as that of the evolution of the molar teeth. The brilliant generalizations of our great paleontologists—Cope, Allen, Osborn, Scott, and others—have formulated a hypothesis of cusp evolution which is entirely satisfactory and sufficient to account for the rise and specialization of the various forms of molar teeth as found among mammals, and especially of the teeth of man. "Modern tooth science, says Professor H. F. Osborn,* "springs first from the demonstration of Rütemeyer's hypothesis of 1869, that the teeth of all mammals center around a single, reptile-derived type. . . . The brilliant discoveries of Kukenthal, Leche, and Rose begin to show how, in various ways, the mammals early modified the regular succession of all of the teeth by suppression of parts of the multiple series. . . . Then as to how heterodontism arose as the conic rows of teeth were specialized in different parts of the jaw for three or four functions. After the teeth were thus divided some functions became more important than others and established a monopoly, causing first a marked difference in the relative development of the series, resulting finally in the loss of certain teeth. In the mean time began the special evolution of the form of the back teeth or molars." The molar teeth become differentiated at the later stages of mammalian evolution, for they do not appear, as molars, in lower vertebrates. The function of mastication had not yet appeared, and consequently masticating teeth were not developed until the demand arose for the comminution and insalivation of food.

Grinding or tooth-like organs appear low in the scale of animal life, such as the cusp prominences upon the surface of the stomach-oliths of the crustacea and some insects, although very few of the invertebrates possess triturating apparatus of any sort. Crushing teeth first appear in the lowest vertebrates, the fishes, such as the pavement teeth of the rays or the rounded teeth of the wolf-fish, and similar forms. But these are not true masticating teeth; they do not triturate food nor insalivate it. The lizards show the first tendency to tuberculate teeth, which are the beginnings and forerunners of the molar teeth of the mammalia. Even in the lowest mammals, as the duck-bill platypus and some ant-eaters, horny substitutes for teeth are found, true molars not yet being developed. In the Bruta, the sloths and the armadillos, the molars are of simple cylindrical form for crushing and grinding. In the Insectivora the molars are highly specialized, with long-pointed cusps for crushing the hard covering of insects. In the Carnivora the molars are reduced or aborted, except the lower first molar, which, with some of the premolars, have the tubercles developed into long cutting blades for dividing flesh. In the Herbivora the molars are highly elaborated by pleatings and foldings of the tissues to form long crests and ridges, which when worn present a constantly rough face for the effective mastication of resisting vegetable fiber. The Carnivora and the Herbivora, at the extreme ends of the scale of diet, offer the highest examples of the greatest specialization of the molar teeth, but between these extremes the denture becomes modified for an omnivorous diet. The main dental characteristic of omnivorous animals, as man, bears, dogs, etc., is the rounded tubercles upon the molar teeth. The dog is carnivorous with omnivorous modifications, and so has more tuberculate molars, and more of them than the cats. The hog is herbivorous with omnivorous modifications, and has molars with sharper cusps than the cow or horse. The molars of man are more tuberculate than those of either the dog or the pig, and hence he is more omnivorous than either. He stands midway in the list between the two extremes of the Carnivora on the one hand and the Herbivora on the other.

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*"Rise of the Mammalia," Proc. A. A. A. S., 1893, p. 189.

Man is, as regards his general organization, low in the scale of animal structure, for, as Professor Cope said,* "in man the feet yet retain the pentadactyle plantigrade type which characterizes the mammalia of the Puerco epoch and most of the Lower Eocene. His dentition is not lophodont, but simply bunodont, like that of some forms of the Lower Eocene. . . . In his teeth his character is thoroughly primitive. He possesses, in fact, the original quadrituberculate molar with but little modification." Man is, morphologically as regards his dentition, a diphyodont heterodont bunodont of a simple type. His dentition is not so highly organized as either the Carnivora or the Herbivora, but is of an archaic form (such as is found far back in geological times, and then adapted to a mixed diet), which characterized the generalized progenitors of the highly specialized mammalia of to-day, before the extreme differentiation of these later forms took place.

An analysis of the genetic elements of the structure of the molar teeth shows them to be composed of definite parts, which have been named in reference to the history of their evolution. The original and primitive form of tooth is that of the single, simple cone, as illustrated in the teeth of fishes and reptiles and some mammals, as the Cetacea, which are of simple conical shape without modification (*a*, Fig. 1), which alternate with each other in occlusion. This is the primitive type of tooth, the *haplodont* form, from which all others, even the most complex types of the molars, were derived by modification and duplication of the simple cone in various directions. As Cope said,† "The transition from simple to complex teeth is accomplished by the repetition of the simple cone in various directions. First, there are cylindrical crowns, then flat ones, then divided roots, then internal repetition of root and cusp, then posterior repetition, etc. Very complex teeth, as the multituberculate molars, are formed by both posterior and lateral repetition." Professor O. C. Marsh said years ago,* "The primitive form of tooth was clearly a cone, and all others were derived from this. All classes of vertebrates below mammals, many fishes, reptiles, and birds have conical teeth, if any, or some simple modification of this form. The Edentates and Cetaceans retain this type. In the highest mammals the incisors and canines retain the conical shape, and the premolars have only in part been transformed. These gradually change to some complicated molar pattern, and hence are not reduced molars, but transitional forms from the cone to more complex types." Professor Osborn again says,† "The primitive form of the mammalian molar was a single cone, to which all the other cusps have been successively added. The slow transformation of the single fang, reptilian, conical tooth into the low-crowned molar can be readily shown. . . . In the Eocene mammals we can observe the actual rise, succession, and decline of all of the molar cusps. In the fossil remains between the Trias and the Lower Eocene formations we are, so to speak, in at the birth of every successive cusp, and can observe that the law of cusp evolution is that they are the direct upgrowth from the smooth slopes of the crown, or from the cingule, that fertile parent of new cusps. . . . Every cusp and facet has its value; not as a sign-post for new species perhaps, but as being suggestive of some function or relationship."

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*"Primary Factors of Organic Evolution," p. 150, and "Origin of the Fittest," p. 268.

†"Origin of the Fittest," p. 241.

The German theory of cusp evolution is at variance with that of the American anatomists (who have so long held the modern philosophy of tooth evolution from the single cone), and is known as the "concrescence theory" (Osborn, *l. c.*), as expounded by Rose, Kukenthal, Perl, and others, and earlier supported by Gundry, Magitot, and Dybowski. This is the fusion hypothesis, which derives all the teeth, even the multituberculate molars, by the fusing together of numerous single reptilian crowns or cones. Thus a triconodont crown was formed by the bringing together of three reptilian conical crowns (*b,* Fig. 1), quadrituberculate molars by the fusion of four cones, and so on. They hold that there are no exclusively characteristic or structural differences between mammalian and reptilian teeth; that none of the characters of mammalian teeth are perfectly constant; that the dentition of mammals was derived from that of reptiles, etc. From this all of our great paleontologists and anatomists dissent. Osborn says that "three main differences are apparent between mammalian and reptilian teeth,—viz, (1) in the capacity of mammals for the multiplication of cusps upon the crown; (2) in the divisibility into roots when the crowns become multituberculate, and (3) in the independent origin of the cingule, the parent of the cusps. None of these items

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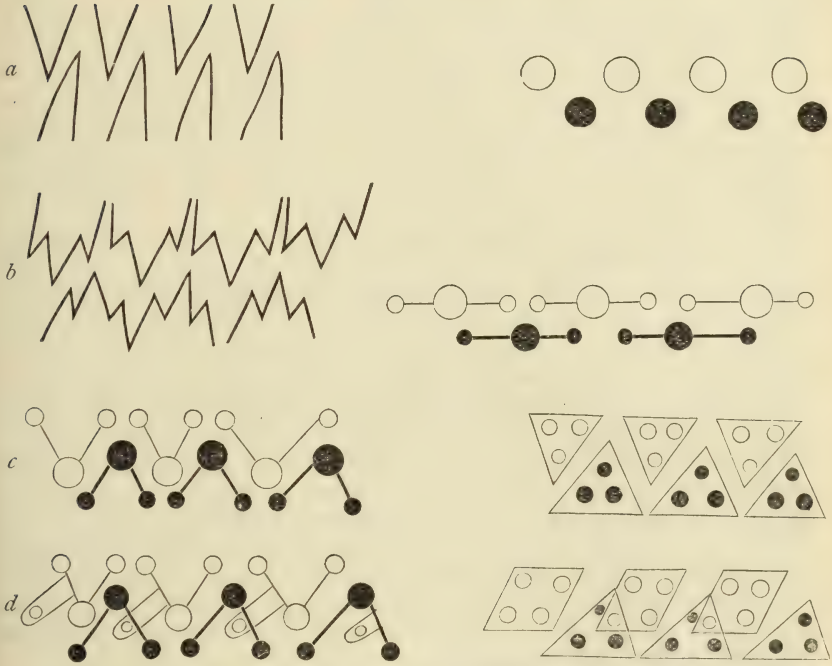
*Proc. A. A. A. S., 1877.

"†Rise of the Mammalia," and also "The Homology of the Human Molar Cusps," Am. Museum Reports, 1892, p. 740.

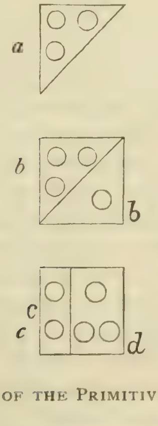
FIG. 1.



MOLAR EVOLUTION FROM THE SIMPLE CONE.

a, the single cone, reptilian, haplodont form.
b, three cones in a row, the triconodont form.
c, three cones in a triangle, the trigonodont crown.
d, the formation of the quadrituberculate crown by the throwing out of the talon from the side of the trigon, which supports the fourth tubercle.

FIG. 2.



THE EVOLUTION OF THE PRIMITIVE HUMAN MOLAR.

a, the trigon of the upper molar.
b, the heel or talon added to the talon which carries the fourth tubercle, the hypocone.
c, the trigonid of the lower molar with the talonid (*d*), carrying three tubercles.

are found in the reptiles of any epoch. In this theory of the origin of the premolars and molars Professor Rose has gone far astray from the actual considerations observed in development. It may be especially pointed out that the oldest types had only three or four cusps, while some of the newest types, remote from the reptiles, have as many as twenty-five. Thus the multituberculate molar was not the primitive form, as the fusionists claim, for originally the molar embraced but three single cones arranged in a single line, the triconodont form (*b,* Fig. 1). . . . The fusion hypothesis as applied to mammalian teeth comes from a one-sided morphology which regards only the wonderful, though mutilated, chapters of embryology, and ignores the equally wonderful pages of paleontology. Because, as said before, between the Trias and the Puerco beds of the cretaceous formations of the Western United States we are in, so to speak, at the birth of every successive cusp, and can assert most positively that the cusps are a direct upgrowth from the smooth slopes of the crown or from the cingule." The concrescence theory is thus opposed by American paleontologists with what they consider the more conclusive evidence furnished by the phylogeny, or the evolutionary history of mammalian teeth. So many wonderful illustrations have been discovered among fossil animals as to tooth evolution by means of the modification and duplication of the primitive one as to place the principle beyond doubt. This is now the working theory of American paleontologists and anatomists.

Taking the steps of molar evolution in order, we have the following well-defined stages: First, the simple reptilian conical tooth, the *haplodont* form, as it is called by anatomists (*a,* Fig. 1). This form of tooth still prevails in the fishes and reptiles and in some mammals, as the Cetacea, and the canines of some higher mammals. The next step was the evolution of cingules leading to cusps upon the sides of the primitive cone, the protocone, making a crown with three cones in a row. This is called the *triconodont* form of crown (*b,* Fig. 1). This is still found in the premolars of the Carnivora and Insectivora, the molars of seals, and others. The triconodont molar is very primitive, and appears in ancient fossil types. The next step was the shifting of the cones to form a triangle, giving the molar crown that form. This is called the *trigonodont* type, and the triangle with the three cusps is called the *trigon.* In the upper jaw the central cone, the protocone, moved to the lingual side, and the two others, the metacone and the paracone, to the buccal. But in the lower jaw the central cone moved to the buccal side, and the other cones to the lingual, so that the triangles passed each other with a shear-like motion (*c,* Fig. 1). This form of molar was so effective for food reduction that it remained permanent in many forms, as in some of the Carnivora, Insectivora, lemures, and others. It may be observed to-day in the American opossum, whose upper molars describe perfect triangles. But the more extensive manipulation of some foods demanded an extension of the crown in some animals, so that the next step toward its further elaboration was the throwing out of a heel or *talon* from the side of the triangle (*d,* Fig. 1) to support a cusp which should strike in the valley of the opposing triangle like a pestle in a mortar. This formed the quadrituberculate crown, and from this the molar was further elaborated in different directions by the addition of many cones with tubercles and roots to respond to the increasing demands of mastication in some animals. This is illustrated by the multitubercular molars of the Herbivora and the Insectivora.

In man, however, the molar teeth remained of a very primitive quadritubercular type. The human upper molar consists only of the trigon (*a,* Fig. 2), to which was added the heel or talon which carries the fourth tubercle or hypocone (*b,* Fig. 2). This tubercle is somewhat erratic in the upper molar teeth of man, sometimes being entirely absent, and the crown being reduced to the tricuspid form, with the trigon alone remaining, which is a very ancient type. This fourth tubercle is quite constant in the first upper molar, is reduced in the second, and is absent in the third, as a rule, in man, especially in the higher races. In the lower molar the *trigonid* (as it is called below) supports but two tubercles (*c,* Fig. 2), one having been lost early in the phylogeny of this tooth; but the heel or talonid (*d,* Fig. 2) supports three tubercles, thus making the five of the lower first molar. In the second, however, there are but four tubercles, one, the hypoconulid, having been lost from the heel.

A most interesting branch of the study of the evolution of the molar teeth is that of the tritubercular molar, which is the primitive type of molar of all the mammalia, as described by Cope in his brilliant generalizations deduced in his hypothesis of molar evolution called "Trituberculy." He demonstrated that the tritubercular molar was the actual form of molar of those early mammals from which all later forms were derived, which followed the establishment of that conic, triconodont form, which was the most primitive type. Cope said,* "It is now apparent that the type of superior molar which predominated during the Puerco epoch was triangular or tritubercular. This fact is important, as indicating the mode of development of the various types of superior molar teeth. There were two external and one internal cone or tubercle. It exists to-day only in the Insectivora and Carnivorous marsupialia (as in the American opossum) and in some Carnivora. This triangular upper molar is correlated with a corresponding form of the anterior part of the inferior lower molar. This form of molar I have called the tritubercular sectorial, and it is very variable as to the degree of development of the sectorial cutting-edge. The mechanical action of such triangular teeth is as follows: Of course it results from the form of the superior molar that the spaces between them are wedge-shaped, the apex external, the base toward the palate (*c,* Fig. 1). In the lower jaw the position of the triangle is reversed, and when the jaw is closed these triangular prisms exactly fit the space between the opposite ones. The alternate parts of the inferior and superior molars form an alternate series, as distinguished from the present opposed dentition of the mammalia which was developed from it. In this alternation of the teeth this primitive triangular dentition resembled the reptilian dentition." From this early triangular form of the molars all later quadritubercular and multitubercular forms were derived by the addition of cones and roots, as the necessity arose for the more effective mastication of extended diet.

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*"Origin of the Fittest," p. 356.

THE MASTICATORY MOVEMENTS OF THE LOWER JAW AND THE RULES FOR PROSTHESIS DEDUCIBLE THEREFROM.

BY PROFESSOR DR. FR. HESSE, LEIPSIC, GERMANY.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE articulator plays an important *rôle* in the construction of artificial dentures, inasmuch as it enables us to set up the artificial teeth outside the mouth in accordance with anatomical laws and the special conditions present in any given case. It serves to meet two essential requirements which are demanded of the artificial substitute,—namely, esthetic appearance, as well as utility for the function of mastication. The instruments in use until the introduction of Bonwill's articulator, and which are yet largely, even almost exclusively employed, fulfill at the most only the first of the above requirements; they give no hint in advance as to the functional utility of the substitute, rather do they premise great skill in their employment and the happy chance that the dentist may succeed in placing the teeth in accordance with the anatomical conditions of the mouth. They are all pure hinge joints, simply modeled upon the position of rest taken by the lower jaw at the time when both condyles rest in the glenoid fossæ of the temporal bones and the masticatory surfaces of teeth are in apposition with those of the antagonizing jaw.

This position of the teeth can be imitated by the old articulators in such fashion that the substitute can be made to take the same position when the mouth is closed. It does not follow, however, that in this way the artificial teeth will be so placed as to permit the proper movements of the lower jaw with reference to the upper. This takes place only in that movement in which the lower dental arch separates from the upper, whereby collision of the two arches is avoided; that is, especially in opening and closing the mouth.

In order to see that this is inadequate for the movements of mastication, it is necessary to consider the masticatory movements of the lower jaw.

The reduction of the food into small bits is accomplished in the first instance by the pressure of the lower molars against the upper. We find, accordingly, the molars provided with broad grinding-surfaces, and a series of muscles whose function is to bring the lower jaw into contact with the upper. These muscles surpass by far all the other muscles of the jaw in number and power. This movement from below upward is supplemented in man and all mammals which masticate their food by a second motion from right to left, termed "grinding movement." It is for the carrying out of this motion that the articulation of the jaw is not limited to the glenoid cavity of the temporal bone, but extends to the eminentia articularis. If you ask yourselves what is the nature of this movement, you will be in a quandary to give a clear reply. This at least has been my experience in the case of those I have thus far questioned upon the point. The means at our command for solving the question are observation of the movements upon the skull and during life. Plastic substances have also been placed between the arches, and the attempt has been made to deduce an explanation of the movement from the changes observed in the mass through mastication. These methods are, however, inadequate, for the phenomena are too complicated to be explained in any such way. Nevertheless, they were of service in proving to me that it is necessary to put the question in another manner. One must not inquire what movement the lower jaw as a whole makes during mastication, but rather that of a single point of the same.

This can be most easily discovered by tracing the path followed by a single point of the lower jaw.

Inasmuch as a perfect dental arch is not adapted for such observations, I have chosen a jaw in which some teeth were wanting. In the intervals I placed the end of a lead pencil in a vertical position, so that it impinged upon the upper teeth.

In order to obtain a better transcription surface than that offered by the enamel of the upper teeth, I covered the antagonizing teeth of the upper jaw with a layer of hard rubber. Both parts of the apparatus being fastened in the mouth, the jaw closed, and the grinding movements carried on in short excursions, a black stroke is found to have been made upon the rubber, extending almost in a straight line from the gingival to the buccal margin, with a slight concavity directed backward. The inner end of the line is the point where the point of the pencil touches the masticating surface of the upper teeth when the jaw is at rest. No matter how often the movement is repeated, no marking, save the line noted, appears.

I perceived at once that this line failed to show the entire path described by the point in question of the lower jaw, but only that portion becomes visible which is described so long as the two jaws touch each other. If the grinding motion becomes so decided that the condyle of the side under observation passes over to its eminentia articularis, the pencil point separates from the upper jaw and no longer records its path of movement, not touching the rubber plate. I therefore attached the pencil to a small spring, by which it was lifted up as the lower jaw was depressed, and I thus obtained a new record (line). This commences at the same point as the former, but extends thence forward and inward. The entire path which the point of the pencil can describe during the widest lateral excursions of the lower jaw (to right and left) is therefore an obtuse angle, with the opening directed forward and outward.

The transverse side of this angle represents the path traversed by the point of the lower jaw when the latter is moving laterally, the head of the bone remaining within the glenoid cavity, while the lateral side of the angle is described when the head passes over to the eminentia articularis.

What is the reason that the lateral side of this angle is alone of significance in the act of mastication?

In the first place, it is only during this part of the movement that the lower and upper jaws remain in contact, while during the other portion the jaws separate,—that is, leave an interspace,—checking the division of the food. Accordingly, the grinding movement is only effective during simultaneous contraction of the muscles of mastication of the side in question,—masseter, temporal, and internal pterygoid. These muscles hold the head of the bone so firmly in the glenoid fossa that it cannot be forced over upon the eminentia articularis, while permitting the turning of the corresponding head of the bone about a vertical axis; a movement necessary to the transverse play of the lower molars, and which, considering the dimensions of the fossa and the arrangement of the ligaments, can be accomplished without the head leaving the cavity.

At this moment the three muscles of mastication of the opposite side are in a state of inactivity. But now the external pterygoid is free to contract and pull the head of the bone upon its side upon the eminentia articularis. This is the muscle which brings about the grinding motion proper of the opposite sides of the jaws. The grinding motion of the right side is accordingly the resultant of the simultaneous contraction of the three muscles of mastication of the right side, together with that of the external pterygoid of the left side.

With these principles in mind, you will be enabled to readily understand the differences in the paths which the molars of the two sides describe during the grinding motion upon the skull.

We mark out in the region of the molars two overlying points by means of vertical lines. At the completion of the grinding movement these lines will be found to remain vertical over one another. Upon one side (condyloid process within the fossa) the masticating surfaces of the upper and lower teeth remain in contact, but the outer edges of the lower molars project beyond those of the upper. Upon the opposite side the coronoid process has advanced upon the eminentia articularis; the line marked upon the lower teeth has advanced far forward; the upper and lower teeth are separated by an interval, and the lower are, moreover, pushed forward and toward the tongue.

You see, thus, that the transverse movement of the lower molars against the upper, with uninterrupted contact, is the essential condition which must be fulfilled if the movement of mastication is to be effective. Inasmuch as this movement cannot be accomplished with the simple angle articulators, the latter are unable to throw light upon the question of greatest importance,—namely, the functional requirements of prosthesis.

Bonwill has replaced these by means of an instrument most happily conceived, wherein this defect has been overcome. In order to imitate the natural lateral excursions as closely as possible, he has based the dimension of his articulator upon that of the jaw. The distance between the turning points is 10 c.m.,—*i.e.,* the average distance between the centers of the fossæ. It is then only necessary to so arrange the cast of the lower jaw that the interstice between the two lower middle incisors shall also come to lie 10 c.m. from both turning points. This gives an arrangement of the cast which fairly corresponds to that of the lower jaw with reference to the articulation. You can readily convince yourselves that under these circumstances the separations of the lower teeth as we cause the jaws to go through the grinding motion completely correspond to those with which we have become acquainted upon the skull.

The instrument has been criticised for the reason that its correspondence to the actual position of the lower jaw is only approximate, and not perfectly exact. Perfect imitation in every case being impossible, we must be satisfied with what is attainable. It would certainly be foolish to refuse to avail ourselves of a good thing because it is not perfection. The absence of an eminentia articularis and the consequent inability to reproduce the depression of one side of the jaw during the grinding movement has been urged as an objection. This defect is, however, of small practical import, for when the denture is adjusted in the mouth the structure of the articulation brings about such depression of its own motion.

In view of the great importance of the lateral movement of the lower molars for the act of mastication, there can be no doubt that an appliance which imitates this movement, imperfectly though it be, deserves the preference over such as do not permit the movement.

ART IN PROSTHETIC DENTISTRY.

BY DR. MARY E. GALLUP, BOSTON, MASS.

(Read before the National Dental Association, July 11, 1900.)

It is generally understood to-day among dentists that the term "prosthetic dentistry" applies especially to the mechanical part of the profession. Dental prosthesis is in reality the art of restoring lost natural dental organs for comfort, utility, symmetry, and beauty. This would include nearly all operations performed in the mouth by dentists. The science of dentistry, it would seem, is leading us away from the purely mechanical part. In selecting the subject "Art in Prosthetic Dentistry" I had hoped by models and photographs to give a suggestion of the few points I wish to bring out in this paper. I have been unable to prepare them to my satisfaction. Manipulative art is the basis of true dentistry. It seems to me a mistake of many of our dental schools to require so much specimen work made by the student. I fear it is of little aid for a true test of their ability. Given a practical case for which to supply an artificial denture, it would be a really severe test of artistic ability, common sense, and patience for the student, the future dentist. First, the impression; and what beautiful impressions of the mouth are taken! The student, were he in earnest, would want to know exactly the best manner in which to get a perfect one. He would take a rare delight in making the models as true as possible. The operation of taking the bite would be fascinating, and the arrangement of the teeth as interesting as the painting of a picture. I am confining myself to what we usually refer to as "mechanical" work; that is, artificial dentures. One may put a tooth in one part of the denture or another with most excellent results, but the test of ability is in arranging and grinding a set of teeth; in working into each tooth a bit of the individuality of the patient for whom they are designed. What a field for wonderful work in that direction awaits us!

Prosthetic dentistry and the novel of the day are much alike. The popular novel of the present is oftentimes not artistic literature. It may have life on every page, be thrilling, but crude as to real artistic literature, yet improbable. It is in art as in literature, undue haste everywhere. In the days of Michael Angelo art, true art, was aimed for. And who can read of that divine artist working on his back to produce those immortal paintings that adorn the ceiling of the Sistine Chapel without a feeling of reverence and sacred joy in the presence of such sublime results of infinite patience? And it was Michael Angelo who said, "Genius is infinite patience." I love to think of him hammering and chiseling out of a solid block that wonderful David. For strength and beauty in sculpture, has there been anything superior? In literature and art we finally turn back to the old for inspiration and superiority. Ancient dentistry was crude, and consisted mostly of surgery, yet the ancients studied nature more truly in an artistic way, for true art is to conceal art. The largest per cent. of artificial teeth that are put into human mouths are beautiful, but false. Why? We live in what may be called the "factory" or "machine" age. Hand work is or has been out of date. We send our errands by lightning to the ends of the earth, and have almost forgotten the use of the pen. This is an age of hustle and bustle. When Columbus was about discovering America there were Venetian monks who spent their whole lives in making a single book; to-day books are made by the hundreds of thousands, machine-made books. There was a time when everything was made by hand, and the work was stamped by individuality. Chairs, tables, beds, book-shelves, etc., were made for the places they were to occupy. To-day a house is built, put in the hands of a professional decorator and furnisher, and what is the result? One feels in many houses as though they were miniature hotels, or, better still, private hotels, with one family as guests. There is no individuality, only a certain expenditure of money. Individuality is not fashionable. Does not individuality affect the moral character? True style is the impress of individual character. Study the forms of the dentistry of the Phœnicians. Is there not individuality there? Crude, to be sure, but is not definite character there? They studied directly from nature, and the work bears the stamp of truth. The wear and tear of life leaves its mark. A tree that has borne the storms and snows of winter and the sunshine of summer, is sturdy and strong compared with a tender sapling; so is the art that is born from the conflict of stern endeavor. Did one ever see in the mouth of a man or woman sixty years of age absolutely perfect teeth? There is a peculiar wearing away, a slight change of shade, a development of strength or weakness, character or individuality, if you please to term it, an almost indescribable something that takes place in the mouths of humanity which the truly artistic dentist will try, if called upon to resort to prosthesis, to restore. We all know that the same beautifully perfect factory-made teeth are but the block of marble given us to chisel and hammer, by grinding and forming until we may evolve or work out a bit of individuality into each tooth.

Life is expression. Art is the expression of man's joy in his work. Life is expression. Life is a movement outward, an unfolding, a development. Beginning with the germ, behold how all things that grow develop from within. To obtain a place, a free field, a harmonious expansion for your powers,—this is life. To be tied down, pinned to a task, that is repugnant. And to have the shrill voice of necessity resounding eternally in your ears "do this or starve," is to starve; for to starve the heart, the soul, and all the higher aspirations is to pine away and die. Nature is beauty, and beauty is a gratification, a peace, and a solace to every normal man and woman. Beautiful sounds, beautiful colors, beautiful proportions, beautiful thoughts,—how our souls hunger for them! Mind is only matter with its varied forces, and all beauty is but a symbol of spirit. Art is the expression of man's joy in his work. The man must work with hand and brain, and then out of the joy of this marriage of hand and brain beauty will be born. Blessed is that man who has found work for his individuality. The dean of one of the best dental schools in the country says, "Dentists are born, not made." I believe that is true, though it is only a variant of an old saying, *"Poeta nascitur, non fit."* One may have genius and mechanical ability, but if they are not cultivated with patience, if the fingers and brain are not wedded, will any beauty be born? Genius is infinite patience.

Dentistry so long has been classed with the mechanical arts that its truly artistic side has received little attention. It has seemed to me that during the past ten years, like a vast army led bv a few brilliant generals, the great societies of the profession have been marching "onward and upward." Not long since I heard a physician remark, "We of the medical profession have it in our hearts to lift up the dental profession, make it more than something mechanical." The good man who made that remark represents many of his kind; honest, but, like the vast majority of the world at large, condemning where he knew very little of what he was so kindly considering missionary ground. We have a noble profession; art if you so please to term it. And is it not an art? Almost as soon as the student crosses the threshold of a laboratory he takes his first impression. Who has not been in an art school, or school of design, and seen the students working, modeling in clay and plaster? Is the dental student taught to make his impressions and models "things of beauty and joys forever"? Does not the efficacy of a perfect denture depend largely upon a careful impression and a well-trimmed model? From the very day when, as students, we are given a piece of modelling compound and an impression tray, and shown how to take an impression, when we are taught to mix plaster and run the impression and trim model, we join the rank and file of the artist and sculptor. Truly mechanical. But is not a good bit of the work of the painter and the sculptor purely mechanical? The homes of men are filled with cheap furniture, carpets, and books manufactured by machinery. Emerson once said, "If a man shall do a piece of work incomparably better than his fellows, the world will make a pathway to his door, though he live in a forest." And the motto of William Morris was, "Not how cheap, but how good." Gold crowns and factory-made teeth have had both a good and a bad influence on the art of prosthetic dentistry. Some things can be done as well as others, while other things may be done better than some others. The cry is "cheap! cheap!" Dental parlor people make teeth for five dollars. What is the result? Prosthetic dentistry has received a chill. A large number of practitioners devote little or no time to the art, and cheap mechanics are filling the mouths of the public with dentures that make one gasp for breath at the sight. I have a hobby, and my reward has been so far mostly in a feeling of trying to do the best I can and the kind appreciation of some of the victims. The hobby is this: to study each case presenting itself; the lines of the face, the working of the muscles about the mouth, and to try to get the individual expression, as you would the eyes and mouth for a portrait that you were painting. The mouth is one of the most expressive features of the face, and its possibilities are varied. How easily you can add or subtract ten years from a patient's face by altering the mouth. Break out a bicuspid or incisor! Horrible! The mere twisting of a tooth! I often have amusing scenes demonstrating to my patients these little facts. Many molds of factory-made teeth are beautiful, but is any artificial tooth comparable to a hand-carved one? There is one criticism that is constantly brought against work of this kind,—it is too expensive. How can we expect to benefit society at large when all of this work must necessarily be expensive? It remains for us to educate society to understand that it is not how cheap a thing can be made, but how good. Make it as excellent as it can be made to serve its ends. Cheap products make cheap men. The first thought of socialism is for the worker who makes the thing, not the man who buys it. The man is always of more value than the product of his hands, and to sacrifice the souls of men in order to make cheap things is a very pernicious policy. There is in the dental profession, as in every hive of bees, a goodly number of drones; drones who throw together mechanically an artificial denture, a denture supposed to restore lost natural organs for comfort, utility, and symmetry; who make a gold cap anything but artistic, and cement it over a badly prepared broken tooth; drones that take the easiest way to get a dollar. I am not sure just what the unpardonable sin is, but I believe it may be the disposition to get a dollar in this easy fashion. To make a business of art is to degrade it. After one has learned to take a good impression with each different impression-material, has learned to make a fine model with firm and hard plaster, the next thing is the art of restoring normal occlusion. One may work ever so long and so well, an artistic denture may be nearly perfect, and the articulation spoil it all. Normal occlusion of the teeth is one of the most beautiful things in the study of prosthetic dentistry. Do we as dentists reach its perfection?

My message is that of "idealism"; always to be sought for, yet rarely attained. Our "art and science" is that of both the sculptor and painter; of Angelo and Rubens. Each of us may have only a spark of their genius. That spark needs fostering everywhere, and much in our profession. Form and color is science applied, as we see it in the teeth of the factory. Form and color, selected by the individuality of the worker, adapted to the individuality of the subject, bringing out all that is good and fair in one patient, is art, true art! Perfection in manipulation is the foundation of our profession. Perfection in art is the summit of our attainments. The schools can only point the way. The impulses of our own souls and the emulation of our co-workers can alone lead us to the heights.

TREATMENT OF DENTAL CARIES.

BY M. M. TRALLERO, BARCELONA, SPAIN.

(Read before the International Dental Congress at Paris, August 8, 1900.)

I DO not pretend to present anything new, at least to the great majority of our *confrères* who have taken part in this Congress, because under one or another method all practice rapid treatment, the only reasonable one. But for the sake of those of our *confrères* who are not up to the times, to the great prejudice of their patients and of themselves, I ask, Can dental caries be treated in one sitting? I answer, without hesitation, yes; ninety-five per cent. of the carious teeth which come to us for treatment can thus be treated, and with better results than by long treatments.

It is necessary to employ strict antisepsis, using heat as the principal agent. Hot air for the cavities and the electro-cautery for the canal are our principal agents.

Feeling that your time is precious, I will not speak of the classification and the different methods of treating dental caries, things that are very familiar to you.

I will divide dental caries into two groups, and each group into two divisions: First, caries without treatment; second, caries with treatment. The first part of the first group is generally treated by all our *confrères* in one sitting, except in cases of sensitive dentin. In such cases the patients are told to come back to have dressings of substances more or less caustic applied to the aching tooth, compromising the good result of the operation. I advise hot air as being an excellent analgesic. After isolating the carious tooth with the rubber dam, hot air applied slowly renders dentin insensible to the extent that we are able not only to excavate the cavity, but also to make the necessary retaining points for the insertion of gold fillings.

The second part of the first group comprises the capping operations. When the layer of dentin which covers the pulp is very thin, it is a very prudent step to isolate the pulp by means of an intermediary substance. We use for this purpose a paste made after the following formula, which promptly becomes hard enough to support the pressure required in inserting the gold, and which has given us the very best results:

Oxid of zinc,
Airol [Bismuth Oxy-Iodo-Gallate], āā 1;
Eugenol, *q. s.* to make a stiff paste.

It should be possible to handle this paste with the fingers, just as with cements. It is applied on the weak portion of the dentin, and the eugenol is volatilized by means of hot air, drying out the paste so that it is possible immediately afterward to insert a filling of gold or other material.

The first part of the second group comprises caries in teeth with exposed living pulps. We have been treating this class by means of the ordinary method in two sittings until September, 1899, when our distinguished *confrère,* M. Losada, showed us his method of extirpating the pulp at one sitting. In these cases, after drying the canals, we use a saturated solution of salol in alcohol to moisten cotton twisted around our nerve-instruments, which we then pass over the flame to burn off the cotton fibers. Then we use our nerve-instruments, which can be adjusted to the electro-cautery, and then fill the canals immediately with a paste made after the following formula:

Oxid of zinc, 2 parts;
Xeroform, 1 part;
Eugenol, *q. s.* to make a stiff paste.

The second division of the second group comprises carious teeth with dead pulps. This is the most important division, the one to which the practitioner has to pay the most attention. In the first division asepsis of the canals is certain if the operator has not infected them with his instruments. He must take great precautions not to infect the region around the apex, and must be cautious in the exertion of pressure, especially if the instrument has cotton fibers twisted around it, as in such a case the instrument acts as a piston, and may compromise the result of the operation.

The first step is to apply the rubber dam; the next to excavate the cavity and find the canals, which should be enlarged with cone-shaped burs. We then employ a very thin broach for the extirpation of the remaining nervo-vascular constituents of the pulp. Only after this do we use cotton around our broaches.

At the beginning of the operation we use a five per cent. solution of bichlorid of mercury in alcohol to wash the canals. After the cotton comes out dry, and is no longer impregnated with the secretions coming from the apex, we use our instruments, which we immerse in the saturated salol solution, and which we burn off, just as for the treatment of living pulps, and finish the antiseptic treatment with the electro-cautery.

The filling of the canals is made from the formula already given, and the cavity is prepared as usual for the reception of a filling of gold or other material.

THE STATUS OF THE INLAY IN COMPARISON WITH OTHER FILLINGS.

BY JOSEPH HEAD, D.D.S., PHILADELPHIA, PA.

(Read before the Dental Society of the State of New York, May 9, 1900.)

BEFORE considering the status of inlays let us first examine the characteristics of the perfect filling, then by a comparative table of all the filling-materials the good and bad points of each may be justly ascertained. The characteristics of the ideal filling may be named as follows: (1) Strength sufficient to withstand mastication, (2) resistance to action of oral fluids, (3) color to match the tooth, (4) exclusion of bacteria and preclusion from growth of those that enter the margins, (5) non-conductivity of heat, (6) manipulation easy to patient, (7) manipulation easy to dentist, (8) manipulation inexpensive to healthy tooth-structure.

By a study of the table cohesive gold will be seen to possess the sole and important superiority over all other materials of greatest edge strength and resistance to the crushing force of mastication. True, it excludes bacteria from the cavity, but experience proves that if ever the edge of a cohesive gold filling begins to leak micro-organisms, the cohesive gold seems to be almost entirely lacking in the antiseptic power possessed by tin, gutta-percha, and the cements. And, while it resists perfectly the action of the oral fluids, it is so utterly lacking in the other ideal attributes of good color, non-conductivity of heat, ease of patient, ease of dentist, and manipulation inexpensive to tooth-structure, that in the case of front teeth, soft teeth, or teeth of nervous patients its manifest objections more than counterbalance its advantages.

Soft gold is open to the same objections, while it has the advantages of resistance to wear, resistance to oral fluids, and, to a less degree, exclusion of bacteria. It also seems to possess within itself a power of inhibiting the growth of germs to such an extent that it is often advantageously combined with cohesive gold to make fillings that possess the advantages of both.

Tin has to a marked degree the good and bad attributes of soft gold, but it turns black.

Amalgam bulges under mastication, chips on the edges, rusts, and leaks, but through antiseptic action it precludes decay. It is a moderately poor conductor of heat when rusty, and is easy of adaptation for the patient, easy for the dentist, and calls for a

Attributes of Ideal Filling.	Cohesive Gold.	Soft Gold.	Tin.	Amalgam.	Oxyphosphate of Zinc.	Oxychlorid of Zinc.	Gutta-Percha.	Porcelain Inlays.
1. Resistance to wear of mastication.	Best of all materials for edge strength.	Almost as good as cohesive gold.	Almost as good as non-cohesive gold.	Bulges and chips on edges.	Edge strength good through adhesion. Wears from abrasion.		Lacks resistance to pressure and wear.	Chips at edges; crushing resistance excellent.
2. Resistance to the action of oral fluids.	Best of all materials.		Corrode slightly.		Very poor.		Poor.	Excellent.
3. Harmony of color.	Poor.	Poor.	Unsightly.	Unsightly.	Possibly good for a short time.			Best of all materials.
4. Prevents decay. *a.* Excludes bacteria.	*a.* Yes.	Moderately.	Moderately.	Leaks badly.	Partly excludes bacteria.		Leaks at margins.	Excludes bacteria.
b. Precludes growth of bacteria that enter margins.	*b.* Very little.	Fairly well.	Fairly well.	Very considerably.	Partly precludes growth of bacteria.		Precludes growth.	
5. Non-conductivity of heat.	Bad in its great conductivity.	Less of a conductor than cohesive gold.	Less of a conductor than soft gold.		Excellent as a non-conductor of heat.			
6. Manipulation easy to patient.	Most exhausting of all materials.	Less exhausting than cohesive gold.		Easy to patient.	Easiest of all materials.	Painful to sensitive dentin.	Easy.	Easy.
7. Manipulation easy to operator.	Very difficult to body and mind.	Difficult.	Difficult.	Easy.	Easiest of all materials.		Easy.	Taxes mind, not body.
8. Manipulation not destructive of healthy tooth structure. *a.* Adhesion to cavity walls.	No adhesion.	No adhesion.	No adhesion.	No adhesion.	Great adhesion.		Moderate adhesion.	Great adhesion.
b. Undercuts unnecessary.	Deep undercuts necessary.	Undercuts necessary.	Deep undercuts necessary.	Undercuts necessary.	No undercuts necessary.		Often unnecessary.	Undercuts not always necessary.
c. Free access, and slicing of edges unnecessary.	Necessary.	Necessary.	Necessary.	Unnecessary.	Unnecessary.			Absolutely necessary.

manner of manipulation that is conservative of healthy tooth-structure. Therefore, it is often available where gold is not.

Oxyphosphate of zinc has all the advantages wanting in cohesive gold with the exception of color, and lacks all the good points that cohesive gold possesses. Its edge strength is solely due to its great adhesion. It wears under mastication, dissolves in the fluids of the mouth, and usually absorbs bacteria; but, on the other hand, it prevents the growth of germs, is a non-conductor of heat, has better color than gold, is easy of insertion for patient, easy of insertion for dentist, preserves weak walls, and does not require undercuts.

The same may be said of oxychlorid of zinc, except that it causes pain to sensitive dentin and exposed gums.

Gutta-percha in a similar way, with the exception of color, possesses the good points lacking in cohesive gold, and lacks the good points possessed by cohesive gold. It loses shape and wears under mastication, has poor resistance to fluids of the mouth, poor color, and leaks micro-organisms; but, on the other hand, it inhibits the germs that enter from further growth, it is a non-conductor of heat, is easy of insertion for both patient and dentist, and has a manipulation that tends to conserve frail though healthy walls.

Now, when we come to inlays we have a filling in which the good points of the cement are combined with those of amalgam, gold, or porcelain in such a way as to insure the advantages of both in the largest degree and reduce to a minimum the disadvantages of each. For when a cavity is lined with a thin zinc cement which is squeezed out by the insertion of soft amalgam, this amalgam afterward being dried of its mercury, and the edges of the metal burnished to the cavity-margins, there is to all intents and purposes an inlay of amalgam. This treatment takes away from the amalgam three of its serious objections,—conductivity of heat, lack of adhesion to the cavity, and discoloration of adjacent tooth-structure, —while the adaptation of the plastic metal to the tooth margins can be quite as perfect as though no cement were used. So in using the principle of the inlay with amalgam three distinct advantages are gained without any counteracting disadvantages, all of which would seem to indicate that whenever possible zinc cement should be used under amalgam.

When an inlay of gold is cemented into a cavity by oxyphosphate of zinc all the advantages of cohesive gold and oxyphosphate of zinc are obtained, except that a fine line of cement remaining at the margins may in time prove a source of weakness. Such a filling, compared with the ideal filling, possesses excellent resistance to mastication, resistance—except in the fine line above mentioned—to the action of oral fluids, excludes bacteria or precludes the growth of those that enter, is a non-conductor of heat, and entails a manipulation easy for the patient, while the manipulation of the practitioner does not involve greater hardship or loss of tooth-structure than is called for in the use of cohesive gold. Therefore the two objections that can be raised against this filling are bad color and an edge protected by a soluble cement. Hence we must conclude, given a firm tooth-structure that can bear the mallet without danger, a dentin not sensitive to thermal changes, and a patient not too severely prostrated by the necessary malleting, a cohesive gold filling is superior to a gold inlay, inasmuch as the cohesive filling may have edges that perfectly exclude bacteria, even though it has no antiseptic action on germs. The inlay, though largely inhibiting from growth the germs that enter its margin, does nevertheless allow them to enter, and the filling that keeps out the germs entirely must be held superior to the one that lets in the germs and then destroys them. Unfortunately, in the soft, sensitive teeth of nervous patients the manipulation of cohesive gold does not result in the exclusion of decay germs. The tooth margins may be powdered or weakened in some way by the manipulation or apposition of the gold, and the entering germs cause rapid decay, the cohesive gold not having the antiseptic power of restraining them. The thermal shocks and the overwrought condition of the patient, that sometimes last longer than we could wish, all tend to produce unhealthy conditions of the mouth, and consequent tooth dissolution. In such a mouth the inlay is preferable. The patient should not be made to undergo the malleting. As the germs of decay will probably enter under any circumstances, it is necessary to use a filling whose action will inhibit or prevent their growth.

In approximal cavities so situated that the filling does not show, or where great resistance to the blows of mastication is necessary, the gold inlay is usually to be preferred. Its sole objection is the fine line of cement that connects it with the cavity-walls; but if the gold inlay is properly prepared, burnished, and finished, the line of cement may be rendered so microscopic as to become practically no longer a source of danger. In other respects the gold inlay, when not visible, approaches very nearly the requirements of the ideal filling, having perfect resistance to mastication, power to preclude the growth of bacteria, non-conductivity of heat, ease of manipulation, firm adherence to cavity-walls, and an adaptation not usually so destructive to tooth-structure as is the ordinary insertion of a gold filling.

We shall now speak of the porcelain inlay that in labial and buccal cavities possesses more nearly than any other class the characteristics of the ideal filling. Such inlays may have color that really matches the tooth. They may be set with a cellulose cement that is nearly, if not quite, insoluble in the oral fluids; that excludes germs of decay, and precludes the growth of those that enter. A porcelain inlay is a non-conductor of heat, adheres to cavity-walls, has manipulation easy to patient and inexpensive to tooth-structure. The only real drawback to labial porcelain fillings lies in the great skill and patience required in their insertion. Where, however, porcelain inlays have to withstand a severe strain of mastication, they demand the use of oxyphosphate of zinc as a cement, and are apt to chip on the edges. This objection, therefore, makes them somewhat less serviceable for non-visible approximal cavities in molars and bicuspids than gold inlays. For while the porcelain is sufficiently strong to withstand the crushing force of mastication, the chipping of the margins tends to accentuate the weakness already found in the solubility of the cement that is their sole defense against bacteria. If such chipping occurs on the masticating surface of the molars or bicuspids, the fractured margins may readily be filled with gold in such a way that edge strength equal to gold is obtained. Also if the edges of the inlays are painted with insoluble cellulose before the filling is cemented into place, insolubility is added to the strength and adhesibility of the oxyphosphate of zinc. So with care and patience the guarded porcelain inlay acquires the advantages of gold, cement, and porcelain, with none of the usual defects. For the porcelain fillings properly guarded may possess the natural color that no other filling-material possesses, strength to withstand mastication, resistance to the fluids of the mouth, power to exclude bacteria and to inhibit the growth of those that enter, non-conductivity of heat, and adaptability not excessively expensive of tooth-structure. And if at times the manipulation for the dentist is of necessity so deft and artistic that the highest skill and judgment are required, we should be glad for our own sakes that such development and effort are demanded, that dentistry is so steadily advancing to that position where practice and theory are united in perfection.

THE IMPORTANCE AND USEFULNESS OF TREATING DECAYED TEETH OF THE DECIDUOUS SET.

BY M. F. DUCOURNAU, PARIS, FRANCE.

(Read before the International Dental Congress at Paris, August 11, 1900.)

I HAD the honor of presenting to the National Congress of Paris, in October, 1897, an article on the care that should be given to temporary teeth. In again treating this question here my only purpose is to provoke a discussion on these important factors in digestion, and I hope that light will stream out of this discussion.

I attach much importance to the conservation of the deciduous teeth because, under the pretext that they will have to be replaced by the permanent ones, they frequently receive no treatment, and very often disappear long before they are replaced. We are all aware of the disastrous effects which the early loss of these teeth causes, and you surely appreciate the consequences.

The child is from its birth exposed to a great number of disturbances which may cause marked disorders in the development of his little organism and bring about more or less serious complications, varying with the resistance of a strong or weak constitution. The teeth of the infant suffer on account of this pathological condition, which causes a constant acidity of the fluids of the mouth, which in turn causes decay and rapid disintegration of the affected teeth unless prevented by the intelligent intervention of the dentist. Nevertheless, you must have observed, as I have, that deciduous teeth very seldom decay at the beginning of their evolution. Children preserve their teeth intact until two or three years of age; and it is lucky that it is so, because before that age it would be very hard to intervene.

I found very little information in the works I have consulted. Some authors merely say that it is good to treat deciduous teeth, but without attaching great importance to the matter. Préterre is the only one I have found who treats the subject *in extenso*. In presenting his views I beg to apologize to any of you who have considered the question and whose work I have overlooked. He says,—

"On account of a widely extended prejudice, no care is bestowed on the deciduous teeth. Our experience allows us to affirm that it is at this time of life that care is most necessary. It is of great importance to prevent the premature destruction of the deciduous teeth and to insert gold fillings, just as for permanent ones. It is as necessary to the infant as it is to the adult to have teeth with which mastication may be possible. If the teeth make him suffer he will not eat, and the consequence would be arrest of the development of his organism. The presence of the deciduous teeth favors the normal development of the maxillæ, which is not entirely completed at that time. Their premature shedding causes, as we will explain farther on, irregularities in the position of the permanent ones. The maxillary bones of the infant before the eruption of his teeth are very different in shape and size from the shape and size which they assume after the eruption of the permanent teeth.

"From the age of six months to that of thirty months the maxillary bones undergo modifications by the successive eruption of the different groups of deciduous teeth. At this period they could not offer to the twenty-eight teeth of the second dentition the space they require, and the maxillæ remain for four years more with only twenty teeth. During this time they develop, and the alveolar border increases. When this process is sufficiently advanced the permanent teeth, which also have been developing, cause the falling out of the deciduous teeth and take their places. Hence we can see that if caries induces the extraction of the deciduous teeth, or if a bad condition of the mouth hastens their disappearance, the permanent teeth will not find when erupting the necessary obstacle which nature had placed there; will appear too soon, and will surely not find in the narrow maxillæ the space they require, as they will be developed in contact with decayed teeth, irregularities and continuous trouble being the final results.

"Deciduous teeth ought not to be extracted except in cases in which their presence acts as an impediment to the development and assumption of the regular position of the permanent teeth. On the other hand, if in such cases their extraction is unduly delayed the result will be irregularities which take a long time to correct, notwithstanding the special apparatus with which we nearly always succeed in correcting malpositions. The treatment of these cases requires much time and particular care. It is always better to prevent than to cure.

"We can compare the teeth of a child to a young tree. Their beauty, position, and direction will depend altogether on the care bestowed on them during childhood."

The only light in which we can judge this question is that it is incontestable that the child needs to masticate his food just as well as the adult does, in order to accomplish perfect assimilation. It is therefore necessary to keep his mouth in good condition, and thus avoid the inconveniences resulting from faulty mastication. Numerous other reasons could be invoked in favor of the conservation of the deciduous teeth. To one of these I particularly wish to call your attention,—*i.e.,* the irregularities of the permanent teeth, which are commonly caused by a lack of proper attention to the deciduous teeth.

Préterre says that the presence of the temporary teeth favors the development of the maxillæ; that their premature disappearance stops this development and causes malposition of the permanent teeth. If we agree with this contention, and it seems to me it cannot be refuted, it is not doubtful that every time the teeth fall and are not replaced by others the alveoli undergo absorption, the maxillæ diminish in size and diminish the space intended for the permanent teeth. It is the space of the anterior arch of both maxillæ between the four first permanent molars, a space which served for the deciduous teeth (twenty), that the twenty succeeding permanent teeth will occupy; that is, if they find the free space required.

The development of the maxillæ necessary to give space to the second dentition takes place in a very irregular manner. The anterior portion, occupied by the incisors and cuspids, develops less rapidly than the posterior portion; that is, back of the permanent first molar. This latter portion elongates with age from before backward, so as to give room for the second and third molars.

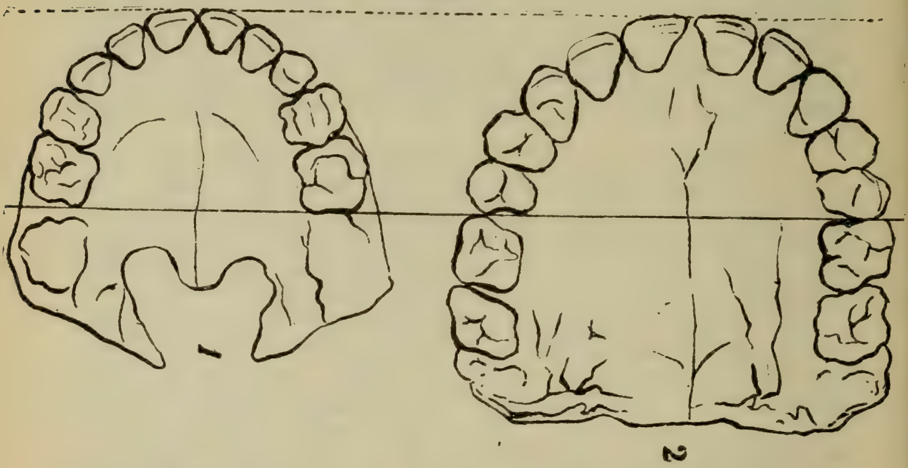
Some practitioners deny the development of the anterior portion of the dental arch, basing their opinion on the fact that if the permanent incisors and cuspids are larger than their deciduous predecessors, as a compensation the permanent molars are smaller than the temporary ones. It is easy to prove the fallacy of this argument by taking an impression of the mouth of a child before the evolution of the permanent teeth,—that is, between the ages of five and six,—and another at the age of fourteen. A comparison of these two models shown in Fig. 1 will show that the arch described by the permanent teeth in the second model is larger than that described by the temporary teeth in the first. In fact, every erupting tooth is accompanied by its alveolus, which adheres tightly to its roots. By examining these models also it is easily seen that the permanent teeth do not occupy the alveoli of the deciduous ones. The alveoli of the deciduous teeth disappear through resorption with the root, and this occurs in order to give space to the alveoli and teeth of the second dentition. The permanent teeth being stronger than the alveoli, are in consequence more developed, forming a more extended circle in the maxillæ. It is due to the lateral development that they find proper space in the arch.

It is also true that if, on account of the premature disappearance of the deciduous teeth, the normal development of the maxillæ does not occur, the permanent teeth will not find the space they require and the eruption will be defective.

I do not claim that these conditions would prevail in every case, as there are exceptions to every rule; but I believe that those malpositions could be prevented by giving to the deciduous teeth the necessary care in order to preserve them, excepting, of course, hereditary cases. In these it makes no difference how much care is used in the preservation of the deciduous teeth, the permanent ones will nevertheless take up irregular positions because of the more or less defective conformation of the maxillæ. Then there is only one thing for the dentist to do, and that is to use the necessary appliance or to extract one or more permanent teeth to correct the deformities.

I shall not speak of methods of correcting irregularities, because that is beyond the limits of my subject, but I wish to demonstrate to you, by the diagrams which follow, the facts that I have just advanced.

FIG. 1.



Jaws of a child aged 5 to 6 years. Jaws of a child aged 12 to 14 years.

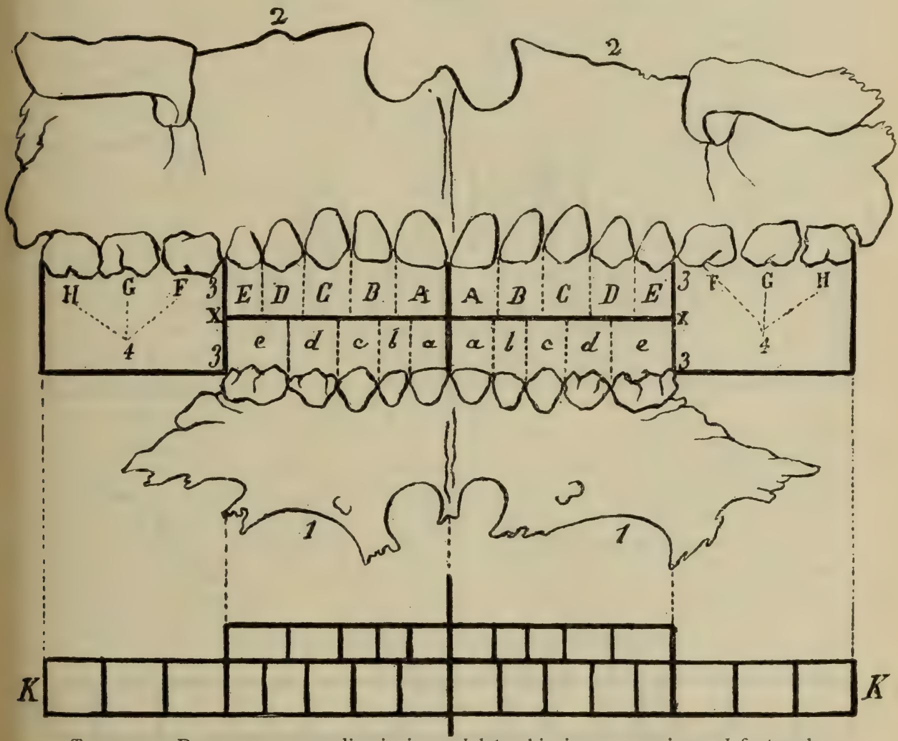
Fig. 2 represents the superior maxilla of an adult with its sixteen teeth in relation with the superior maxilla of a child with its ten teeth. Fig. 3, figured on the same proportional dimensions as the first, with dotted lines to indicate the position which the permanent teeth should occupy if their evolution is normal, is intended to serve as a demonstration and to point out one of the most frequent malpositions. The patient from whom these models were taken is only twelve years of age.

If we examine Fig. 2 we will observe that the permanent central incisors occupy one-third more space than the deciduous centrals; the permanent lateral incisors occupy the space as far as two-thirds of the deciduous canines, and the permanent canines extend to two-thirds of the space occupied by the first deciduous molar. There is left but very limited room for the bicuspids, but, as these teeth are smaller than the temporary molars, the space left between the permanent canine and molar is ample.

If we take into consideration the small increase in size which takes place in the lateral diameter of the dental arch at the moment of the evolution of the permanent teeth, we have great chances that it should be so.

Passing to Fig. 3, we see that the four permanent incisors occupy their respective positions in the arch, but the first bicuspids, probably on account of the absence of the deciduous cuspids and molars, have taken a position in contact with the lateral incisors, obstructing the space intended for the permanent canines, which in consequence have taken up positions outside of the arch. They raise the lip, causing the condition called wild-boar tusk *(défenses du sanglier)*. Also observe that the first molar for the same reason—that is, because of the absence of the deciduous molars—has come forward, preventing the eruption of the second bicuspid, which can occur only on the inside or outside of the arch; and that the second molar for the same reason has taken the position of the first molar.

FIG. 2.



TEMPORARY DENTITION.—*a*, median incisors; *b*, lateral incisors; *c*, canines; *d*, first molars; *e*, second molars.

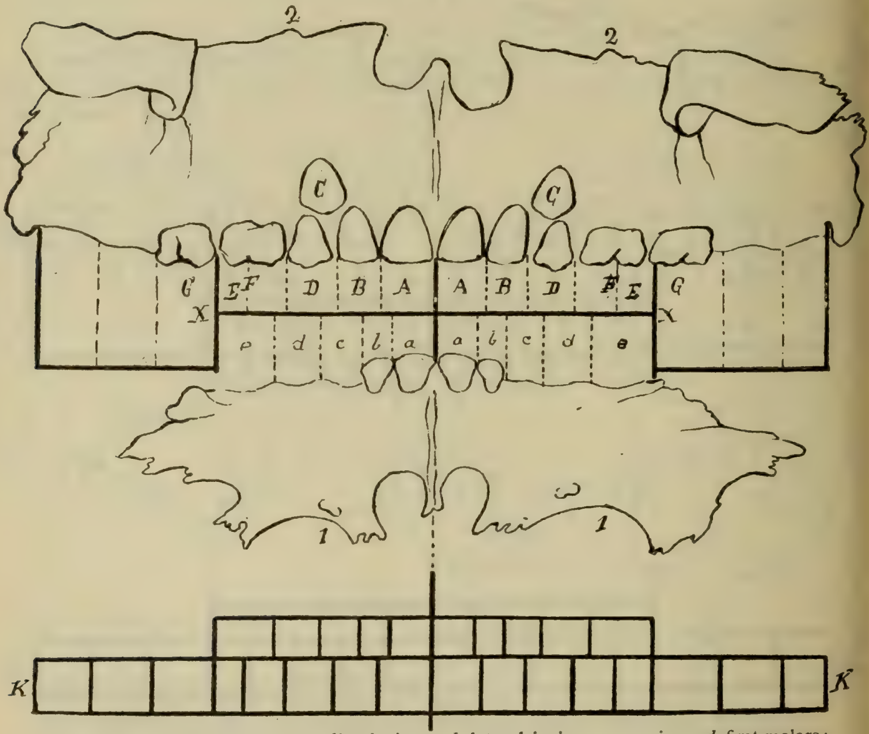
PERMANENT DENTITION.—*A*, median incisors; *B*, lateral incisors; *C*, canines; *D*, first bicuspids; *E*, second bicuspids; *F*, sixth-year molars; *G*, twelfth-year molars.

These malpositions may occur in either of the two maxillæ. Their number and variety are considerable, and it is possible without risk of error to trace their cause to negligence and lack of proper attention to the deciduous teeth.

From these facts I deduce the importance of treating deciduous teeth.

As regards the treatment of caries of deciduous teeth, I continue to apply the principles mentioned in my communication to the Congress of 1897. If it is a question of treating caries of the first or second degree, after cleansing the cavities thoroughly, I fill them with amalgam or cement, according to the case,—all at one sitting. I prefer cement for the front teeth and amalgam for the molars.

FIG. 3.



TEMPORARY DENTITION.—*a*, median incisors; *b*, lateral incisors; *c*, canines; *d*, first molars; *e*, second molars.
PERMANENT DENTITION.—*A*, median incisors; *B*, lateral incisors; *C*, canines; *D*, first bicuspids; *E*, second bicuspids; *F*, sixth-year molars; *G*, twelfth-year molars.

I never insert gold fillings in deciduous teeth, and this for several reasons. The handling of gold is less easy, and the operation is very tiresome for the child. With children it is necessary to act very promptly, otherwise they will not come back, or will not let you operate at the next sitting. I consider that a filling with pyrophosphate made under good conditions is good enough to last until the shedding of the deciduous teeth. And even supposing that the cement disintegrates at the surface, it is always an easy thing to add a little more if the child is brought to the office twice or three times a year.

When I have to treat an approximal cavity in a molar I use copper amalgam, which, although it has the great inconvenience of staining the teeth, I nevertheless consider to possess great preserving properties. And I believe that the first condition to be observed should be the saving of the teeth from the ravages of caries, which is hard to obtain with cements, which, when they are in direct contact with the gums, rapidly undergo dissolution, and serve their purpose in an imperfect way. Copper amalgam, on the contrary, when it oxidizes, hardens the walls of the cavity and forms a continued structure with the rest of the tooth.

In caries of the third degree I never try to save the pulp. Considering that the operation of capping is difficult of performance in deciduous teeth, I do not hesitate to cauterize the exposed pulp by means of an application of Thomas's arsenical cotton. This preparation is less soluble than arsenic in powder, and is for this reason less dangerous. I never leave this dressing more than twenty-four hours. I then open largely the pulp-chamber and replace the arsenical dressing with one of carbolic acid, which I leave in the cavity for two or three days. At the third visit I extirpate the pulp *débris,* and insert a temporary filling of gutta-percha, which is left in for a few weeks to assure the complete insensibility of the tooth, so as not to expose it to pericementitis, which could be caused by the immediate insertion of a filling.

If I have to treat caries of the fourth degree,—an infected, abscessed tooth, or with fistulæ,—at the first sitting I only make a superficial cleaning, and place a dressing of oil of cloves, of formol, or of iodoform. After forty-eight hours I clean the cavity thoroughly. If there is an abscess, I cauterize it with the galvano-cautery and try to pass through the canals to the abscess some antiseptic solution. I change my dressings twice or three times a week, and wait until the abscess has disappeared to fill the tooth. If I am not sure of a radical cure I do just as for caries of the third degree; that is, insert a temporary filling and wait the necessary time before inserting the permanent one.

It is understood that when I make the filling I take care that none of the filling-material should penetrate the pulp-chamber, because, although it is important that the canals of permanent teeth should be filled, the case is not the same with deciduous teeth. A foreign body in the roots of these teeth would act during their resorption as an inflammatory agent.

The important thing with children is to avoid unnecessary pain, which would discourage them and prevent us from doing the necessary work to save their little teeth. This should be our principal purpose, and we can never be too careful while working for that end.

PROCEEDINGS OF SOCIETIES.

MASSACHUSETTS DENTAL SOCIETY.

The thirty-sixth annual meeting of the Massachusetts Dental Society was held at the American House, Boston, June 5, 6, and 7, 1900; the president, Dr. George A. Lowe, of Rockport, Mass., in the chair.

The session opened on Tuesday evening, June 5, at 7.30 o'clock, with a paper by Dr. J. W. Shaw, of Springfield, entitled,—

The Surgical Removal of Impacted Third Molars.

Mr. President, ladies and gentlemen: My subject, as you may have noticed by our program, is on the surgical removal of impacted lower third molars.

By impacted lower third molars I mean those so-called wisdom-teeth that cannot be extracted by ordinary means, by the use of the Physick, the ordinary forceps, or an elevator, without first making way by the extraction of the tooth or teeth next anterior, these teeth being wedged between the ramus and the second molar tooth either by insufficient space or malposition. The cause of this trouble, no doubt, can be ascribed to civilization, to the crossing of the races, and to inequalities of stature. I suppose our forefathers, when the chief occupation was the getting something to eat, paid little thought to their teeth, and had no especial need to worry about their so-called wisdom-teeth, being blessed with jaws sufficiently large to accommodate the full number of teeth, with occasional supernumeraries. But there came a change. With the advance of civilization the struggle became more than for the mere maintenance of the body, going on to the storing up of knowledge and the acquirement and the holding of this world's goods.

So it became a question of "brain, not brawn." Their thought, then, not being directed solely to the procuring of food, but to the storing of knowledge, and to competition and triumph over their neighbor, called for the exercise and development of their brain, with the consequent enlargement of the upper portion of the head and brain-case.

With the development and education of the brain it became the easier to procure food, and the food being better prepared, or at least so prepared as to scarcely require the exercise of the jaws, inversely, and in harmony with the laws of nature,—the development and growth of those portions of the body that have use, and the atrophy of those without use,—with this lack of exercise of the function of mastication there came the consequent lessening and shortening of the jaw, resulting in the squaring up of the face and head, the head of civilized man.

Cases that might seem to belong to an advanced class of over-development may be occasionally noted where the cranium is out of all proportion to the lower part of the head, and with these narrow, undeveloped jaws the teeth of necessity must be cramped for space.

Then comes the question of intermarriage of the races, with their differences of facial and bony formation; and, lastly, this heterogeneous mixing in marriage without regard to nationality, kith or kin, a veritable jumble of inequalities. One a strapping six-footer, healthy and with noble face, with jaws mighty and teeth in place, the other a little rosebud, blessed with grace, with jaws and teeth to match her face.

And now the offspring. Well, that's different. Inheritance with them does not do so well. Perchance, inheriting the large jaws of the one parent and the small teeth of the other, or *vice versa,* would account for the wide spaces occasionally seen between the teeth, or the great crowding of the teeth in the jaws, which so frequently occasion the trouble which gives me an excuse for presenting this subject.

My attention was first called to this especial field in 1887, soon after graduation. A brother suffering with an impacted lower third molar, and having lost the first molar, the second molar seemed very valuable to him. Attempts had been made at extraction without success. He had been told that it would be absolutely necessary to sacrifice the molar next forward, from which he appealed.

I conceived the idea that it would be unnecessary to remove the second molar if the bone overlying and withholding the offending third molar could be cut away, so as to release it.

Begging an opportunity to put my theory into practice, anesthesia was induced with ether, and with engine and suitable burs the bone binding upon the tooth was cut away, and, with an elevator inserted under the forward lower edge, leverage upward and backward was applied and the tooth was out. From that time forward until the present I have never found it necessary to sacrifice a good tooth for the sake of removing an offending one, and I have had a goodly number of what might justly be termed bad cases.

Here and now I want to enter a protest against what seems to me to be a needless sacrifice of valuable teeth, for I frequently hear reports and see evidences of cases where such sacrifices have been made.

The operation is so simple, with such good results, that I see no reason why it should not be adopted.

The chief points to be considered are sepsis, the relation of tooth and parts to the inferior dental artery and nerve, with the branching artery, the mylohyoid, underlying the internal oblique ridge, care in not applying too great a force in dislodging the tooth, thus avoiding the possibility of a fracture at the angle of the jaw.

The instruments required consist of a dental or surgical engine, with suitable burs. I prefer the round and cone-shaped burs, in sizes Nos. 6 to 12, a gum lancet of the axe shape, an elevator, straight, with good-sized handle, mouth-prop and siphon, and possibly suitable forceps for grasping and removing the tooth after it has been dislodged.

The operation consists, first, in locating the tooth with its relation to the ramus and mandible and its bearings on the second molar, with the arteries and nerve underlying, and soft tissue involved. Then, with anesthesia induced, preferably with ether, the mouth-prop in place, the gum or tissue overlying is divided and separated from the bone to allow free use of the bur. With suitable burs the alveolar process and bone impinging about the tooth are quickly burred away to a sufficient extent to allow the dislodgment of the tooth; the placing of the elevator at the proper point for leverage, upward and backward force applied, and success is yours.

The assistant so manipulating the siphon as to draw the blood and saliva directly from the seat of operation, allows the operator to proceed rapidly with the work.

The after-treatment consists in syringing away the cuttings of bone and the keeping of the wound clean until sufficiently healed to care for itself, of course making use of hydrogen dioxid, or any of the many antiseptics that may find favor with the operator.

Discussion.

After illustrating his subject by drawings which he had prepared, Dr. Shaw's paper was declared open for discussion.

Dr. F. S. FAXON, Brockton, Mass. I would like to ask if the doctor does this under an anesthetic?

Dr. SHAW. Yes; ether anesthesia preferably.

Dr. FAXON. I hardly see much chance for any discussion so far as I am concerned, because I indorse the method exactly, and would state that I consider this a most difficult case. In the diagnosis you are apt to decide, where a tooth is imbedded in the bone, that it is pretty nearly straight up and down. I have just had a case of that kind. The position was not quite so horizontal as this one, but I decided that the tooth, from the decay of it, was almost perpendicular. I burred away in the same manner, although I did not bur down on the front part of the tooth, in order to give my elevator a chance. I performed this under cocain. I should have refused to do it unless they allowed etherization. I have not done any extracting for six or seven years, and only undertook this case because the gentleman was an intimate friend of mine. I have found this the most difficult position from which to extract teeth.

Dr. D. H. ALLIS, Springfield, Mass. This subject has been interesting to me, as I have had several cases in the last five years. This abnormal condition is one we all have seen, and as dental surgeons must meet and render aid as becomes our profession. There was one case especially which came to my office recently. The left lower third molar was imbedded deeper down in the jaw than is shown in these charts. The distal buccal cusp was just visible above the gum, presenting its articulating face exactly to the side of the second molar, leaving a space between the two teeth which formed a splendid breeding ground for bacteria. The second molar was perfectly sound, but on passing a broach down between the teeth I came to an exposed pulp. The tooth had been decaying in that position so long that the pulp was actually exposed, and gave the patient a severe toothache for a long time. This same operation was performed without taking out the second molar. The saving point I want to bring out is this: we know that the third molar roots turn backward, and therefore it must take a backward, upward motion to extract these teeth usually. I have done so by this method several times, and it has been so successful that I want to bring this process before you to-night. Suppose you do not want to put your patient under ether, or you do not want to take out the tooth. You place absorbent cotton rolls on either side of the tooth, keeping the space *perfectly dry* at the time of operating; then pack a red base-plate gutta-percha filling or wedge firmly between the two teeth. This acts in two ways: It stops decay, and the nature of the substance, gutta-percha, is to bulge, and in so doing it turns these roots up, and they can be reached. This can be left packed in, and then replaced by another as often as once in four or six months; and you will find that the tooth will gradually right itself from this to an upright, serviceable position. I have seen cases where I had contemplated taking the third molar out, but, using this method, I have found that they could be left there, and they are in service to-day.

Dr. S. G. STEVENS, Boston, Mass. I will ask Dr. Faxon if he cuts away the crown of his teeth to get his elevator under?

Dr. FAXON. No; I cut down into the alveolar process between the distal root of the second molar and the third molar to be elevated far enough to get onto the firm part of the root.

Dr. STEVENS. I understood you cut the crown away.

Dr. FAXON. I have not for years, if ever, done so. I cut down between the third molar and the process.

Dr. SHAW. I might say that almost invariably the people who are suffering with such teeth put off the extraction of them until it is positively necessary. I have had some where I did not think it would be possible to straighten them up. These are ordinary cases which require this procedure. In reference to the gutta-percha, one would have to look sharply after it. I had a case recently of a woman whose face was badly swollen. The teeth seemed to be perfectly sound, but on close examination I found a piece of gutta-percha which had evidently slipped and got back down between the gum, the tooth, and the bone. I removed it, syringed the place, and it got along all right, but at some future time she expects to have the tooth removed. If you find the impacted teeth decaying in this manner, I think it is well to use cocain and take an exploring needle and find out the position of the tooth before you make any further advance. This can easily be done under cocain with suitable exploring points.

Dr. C. T. STOCKWELL, Springfield, Mass., read the following paper:

PRE-NATAL TREATMENT OF TEETH.

It has been said that movements of the world's affairs are, very generally at least, one-sided; that is, things advance step by step on one side at a time. Interest, attention, effort, is centered, at any given time, on certain phases or aspects of questions and problems, rather than on the whole field or realm involved.

It requires but a moment's reflection to perceive that this is true of the dental profession. Those of us who were in active practice twelve or fifteen years ago will remember that the chief feature of interest, that which absorbed the attention of the dental conventions and filled the columns of our journals to a much larger extent than is the case at the present time, related to the scientific side of dentistry. Investigations were being vigorously prosecuted along the lines of histology, etiology, chemistry, microscopy, etc. Bacteriological and allied investigations were especially prominent. This phase of the professional movement *characterized* the time of which I have spoken.

Now, however, the aspect changes. The other half of the professional landscape has come to the front, and commands the attention of the dental world. Manipulative skill and manual training dominate the present hour.

It is well enough, perhaps, that it should be so. It is probably natural that it should be so. Advances are made always largely because of *concerted,* concentrated attention. There appears to be a psychologic hour, a psychologic wave, which marks the arrival and the movements of the *world's on-goings.*

That the manipulative side of dentistry has taken a long stride in these last few years is apparent to all. It has reached a degree of perfection never heretofore realized. This is well, and the profession is to be most heartily congratulated. Please understand me correctly in what I am about to say. I am in most hearty sympathy with the advancement the profession has made and is making along the lines of manipulative and mechanical ability. Dentistry could never have become what it is to-day without this advance on its mechanical side. It is to a large extent *applied science. Unapplied* science does not help the world on to any great extent. I have no word to offer in the way of discouragement in reference to any effort to still further perfect ourselves in all the methods and processes of manipulative procedure.

But I *am* impressed with a feeling that as a profession we are nearing a point where it will be seen to be wise to consider somewhat carefully the real situation. There is danger, is there not, that just now we are depending too exclusively upon manipulative skill? There is danger that we shall rest content, unwisely content, on the resources of the deft hand alone.

Is dentistry to go no higher in its reach and scope than that phase of it embraced in the term manipulative ability? If so, then let us name our calling an *art,* not a profession.

What is the real situation? It is this: human teeth continue to decay, increasingly so in the opinion of many good observers. This hard, bald fact stares us in the face, and will not down at the behest of any degree of perfection of manipulative art. Is there no danger that we may not become so absorbed with the varied and inviting manipulative methods as to forget this fact?

Sooner or later, if we possess real professional integrity, we shall awaken to the fact that dentistry, in order *to be strictly professional,* must put forth its best efforts to stem the tide that calls for such skillful manipulative procedures.

Now, to take another view of the present situation, I am much mistaken if the hour has not come when we are challenged by the public we try to serve to take a higher stand. Intelligent patients are beginning to demand of us something more than the deft hand and the ordinary, conventional methods of prophylaxis.

It is a significant fact that women in the early stages of gestation are beginning to come to us for advice; not for themselves, but in the interest of the expected stranger, the child. This I consider to be one of the best fruits of the numerous mothers' clubs so much in vogue to-day. The question is often asked, "Can anything *now* be done to aid in an effectual way the development of good dental organs?" This, I say, is a most significant fact, and a very encouraging fact as well. And here, let me repeat, is a high challenge to and a serious demand upon our profession.

What are we going to do about it? How are we going to meet it? My own experience for a year or two past teaches me that we are not to escape it. Manipulative skill cannot be relied upon here, of course. The man who prides himself so complacently on being a "practical dentist" will hardly stop to have his wonted fling at science when he is confronted by the serious appeal of an earnest and confiding woman who thus seeks of him advice which, to her at least, seems so vastly important.

To be counted worthy of such confidence, and to honorably meet this somewhat new and higher demand upon us, we as a profession will have to experience a new awakening on the scientific side.

Deteriorating teeth stare us in the face on all sides, and such teeth we shall some day find out constitute a poor foundation upon which to erect a mere mechanical structure that shall prove worthy of a professional reputation. That is to say, any real reputation as a profession must be based upon our success in preventing and combating disease, rather than upon skillful mechanical *reparative* processes.

For real preventive measures we shall have to resort to a careful and thoroughly scientific study of the numerous factors which present themselves as one contemplates the problem involved. We shall have to go back of local conditions to the very beginning of individual life, the primal germ-plasm. We shall have to study the laws and principles of physiology—the new physiology—and of embryology; the laws of psychology and of physics, of psychology especially. We must also familiarize ourselves with the later and better knowledge of the laws of nutrition; the digestive and assimilative processes; the laws of healthful exercise, and, in fact, all that relates to a sound mind in a sound body.

Here a great field opens before us, and to it we are summoned by the exigencies of a demand we cannot escape if we would be found worthy of the confidence being placed in us by an increasing element of an intelligent public.

This class of people are not going to the "dental parlors," nor to the advertising sharks that infest our streets. This demand implies also, does it not, that there is a class arising who are beginning to discriminate between what may be called mere dental mechanics and dental physicians? These questions and this advice are most apt to be sought of the dentist who has built up what is called quite aptly a family practice. Among this class the dentist is employed and consulted as they employ and consult the family physician.

I do not purpose on this occasion to undertake to discuss the question of maternal influence relating to the development and diseases of the teeth. I promised your committee to talk for five minutes only. My object was to merely introduce the subject, hoping that something might be brought out in the consideration which *you* may give it that shall stimulate us all to devote serious study to a phase of our professional duty which, if I am not mistaken, is to assume serious proportions in the near future.

I need not say that it is my firm conviction that a great deal may be done for this class of our patients, even from the present standpoint of available knowledge. And if I succeed in doing nothing more on this occasion than to recall your attention to and induce you to reread, to carefully and prayerfully study, an article and discussion which is to be found in the September, 1899, number of the DENTAL COSMOS, I shall not have appeared before you in vain.

The article referred to is by Dr. Benson, of Washington, D. C., and it was discussed by several of our best men in the profession. The subject of the paper is, "Maternal and Constitutional Influences in the Development and Diseases of the Teeth."

This article has been very helpful to me on several occasions, as well as to my patients, and I have often wished we could have reprints of it in suitable form for the purpose of placing it in the hands of this class of our patients. I know of nothing equal to it for such a purpose.

Of course, each patient must be considered singly. No wholesale or broadside prescribing will do in these cases. And here is one great advantage in a family practice. You come to know very well family histories, idiosyncrasies, peculiarities of temperament, life habits, etc. These things are vastly important in order to intelligently advise and to instruct wisely and successfully.

There are, however, general lines which are applicable in nearly all cases, and these, as indicated by Dr. Benson, may be summed up under the heads of "food, fresh air, and healthful exercise." These are the important general factors "tending to produce in the women of our country that high standard of health and physical condition which would assure to them a robust and hearty constitution, and to their offspring an inheritance equally rich in the blessings of health."

In the discussion which followed this paper much emphasis was laid upon malnutrition as the first cause of much of the dental trouble of the mother during gestation. They fall under the curse of impoverished food and false assimilation during this period. "Failing these, their offspring are brought into life without the strength of constitution and perfection of nutritive power which would develop dental organs able to resist the ravages of disease and decay.

"The mother should be rich in phosphorus, magnesia, potash, soda, sulfur, and lime. Without these elements in sufficient quantities the child is born enfeebled in brain, nerve, and bone tissues, and particularly the tissues forming the teeth. *While all other deficiencies may be improved or remedied after birth* by the administration of proper nutriment, and perhaps some of the preparations of phosphates, *no improvement can be made or defects overcome in the teeth* known to us. As the crowns of the teeth are formed before the child becomes a breathing being, if lacking in mineral salts, so they remain until lost by the ravages of decay, painful companions to their possessor and a worry to the conscientious dentist in his *vain* efforts to save them even for a few years of usefulness." (Dr. W. A. Mills, Baltimore, Md.)

The same gentleman goes on to say that "probably the chief cause of the dental decay of our time is the almost universal use of white flour, which, through the improved (?) milling process of the present day, is deprived of all the mineral salts, and contains, instead of the whole wheat,—man's staff of life,—only pulverized starch."

There was general agreement in this discussion with these statements which I have quoted. And, while I agree in the main with them, I am inclined to think that there are other equally important factors. If this were all, the problem would be vastly simplified. This solution is too easy. There are other and deeper factors involved in the question of securing to future generations that quota of *vitality* necessary to combat successfully with that vast array of attacking forces on the field of life.

Survival, whether it relates to the physical unit or individual component parts of that unit,—the dental organs or otherwise,—depends, more than anything else, upon that *something* we term the *vital powers* of the unit.

The great question then is, How can we aid in the great scientific mission of endowing succeeding generations with a higher order and quality of vital force? Dr. Benson says we are to look chiefly to "food, fresh air, and healthful exercise."

Here, it seems to me, he comes near the best knowledge of the present hour, for he hints at the necessary assimilative processes, as well as the supply of the required materials.

There are many other contributory factors, such as the *mental attitude* of the mother, etc., during the gestative period, which I have not the time to go into now, and which I prefer to leave to the discussion that may, I hope, follow this very inadequate presentation of a vastly important subject.

After some discussion, in which no special feature of value was brought out, Dr. STOCKWELL closed by saying, It seems to me that in the discussion so far we have touched almost every subject but the subject supposed to be under consideration. The real question is, What are you going to say to the mother who consults you during the early stages of gestation? What can be done during the stage of gestation to aid in the development of good dental organs, not how shall poor dental organs be treated after birth. I do not know that I now have anything to suggest further than what I tried to say in my paper. I do believe, as I said in my paper, that much can be done in these cases. These questions have not been asked so freely until within the period of a few years. Interest in this matter is apparently one of the many good things resulting from the work of the mothers' clubs which are so much in vogue at the present time. These mothers are coming to us with these questions. What will you say when you are asked these questions? We cannot answer them in a wholesale way. We have got to consider every case by itself. To one lady who asked me the question I said, "Madam, in my opinion you need do nothing whatever." She was physically, mentally, and spiritually a perfect type of a perfect woman, well balanced in every sense. Nevertheless, I believe it was of benefit, and will be of benefit, to that coming child that this mother asked this question. The very fact that this question was asked will prove a benefit. I am not a "mental healer," but I believe there is great truth in the effect of the mother's mental attitude during this period. The very fact that they come and ask these questions shows the mental attitude. I believe we can give them advice which will be of benefit. It is a question which, as I have said, has arisen somewhat recently. It is a field which we have got to study; we have got to look forward along that line. At present I cannot say more than I have done in regard to food. I do not advocate, if you will notice carefully what I have said, generally supplying the mother with any particular kind of food. I have, however, in some particular instances suggested certain kinds of food. I think white bread is poor food for any one. After all, it is largely a question of assimilative power and of vitality. The time is coming when we have all got to meet this persistent question. How are you going to answer the mother? That is the real question. They are going to ask just such questions, and we want to have some intelligent conception of a practical answer to give them.

(To be continued.)

DENTAL SOCIETY OF THE STATE OF NEW YORK.

At the annual meeting of the Dental Society of the State of New York, held in Albany, May 9, 1900, papers were read by Dr. F. J. Capon, of Toronto, Canada, on "Porcelain as a Beneficial Art in Dentistry,"* and by Dr. Joseph Head, of Philadelphia, Pa., on "The Status of the Inlay in Comparison with Other Fillings."† The papers were discussed together, as follows:

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*Printed in full in the Dental Cosmos for September, page 831.

†Printed in full at page 1013 of the current number.

Dr. JOHN I. HART. A consideration of Dr. Capon's essay convinces me that if, for some reason, porcelain inlays were interdicted, still beneficial results would have been accomplished by their use and consideration. A true artist disguises the substitute, or, if you please, renders the substitute as inconspicuous as possible. Many operators, fortunately, have not diverged from this path, but some evidently feel that their metallic restorations could not be too conspicuous. Porcelain will cause this class of practitioners to pause and their patients to question, with the result at least of rendering gold less conspicuous, if not the greater use of porcelain.

I am delighted at the breadth with which the essayist has treated the subject, indicating the many uses to which a knowledge of porcelain and its working qualities may be applied. I think the objection of difficulty of repairs to electric furnaces has been eliminated in the Timme electric furnace. I fully concur with the essayist that an all-porcelain crown is preferable to one that is only faced with porcelain. The latter, to be at all resistant to the force of mastication, must be tipped with metal, this treatment in all instances rendering the crown less satisfactory esthetically, and not any stronger than an all-porcelain crown.

Unquestionably, the weakness of a porcelain inlay lies in the cement that is used to retain it, and when a portion of the filling is sheltered this danger is magnified. Eliminate this weakness; in other words, produce a cement that is insoluble in the oral fluids, and the dental millennium will have been reached.

Dr. WILLIAM D. TRACY. It seems we are all harping on the same line. It is a little hard to discuss a paper such as Dr. Head has written, but I will give you the remarks I have prepared, even if some have been given by others.

The paper just read by Dr. Head has been very interesting to me, and at this time, when so many practitioners are using porcelain, and so many others are becoming interested in it, it is particularly opportune.

Dr. Head has probably done more toward the introduction of the porcelain inlay as a useful tooth-filling, by practical demonstrations and practical papers, than any one on this side of the water, and it is gratifying to hear from him this comprehensive article on the status of porcelain inlays as compared with the other fillings generally in use.

There is no longer any doubt in the minds of those who have used the method as to its value in a certain class of cases, but in no branch of our work is mature judgment more essential.

With a certain class of practitioners esthetic considerations seem to have but little weight, and with another class the tendency seems to be to sacrifice the practical to the esthetic. But if we so cultivate our discrimination that we may strike the happy medium, we will find in porcelain a most valuable addition to the methods now in use.

In mentioning the advantages and disadvantages of amalgams, the doctor says that, through its antiseptic action, amalgam precludes decay. In the case of some of the copper alloys this is undoubtedly so, but in my observation it seems to me that the antiseptic action of amalgam, generally speaking, is not evident, and that recurrent decay takes place around a defective amalgam filling as quickly and as surely as it does at the margin of any other filling of similar environment. I shall hope to hear the opinion of others on this point.

Gutta-percha is mentioned as having poor resistance to the fluids of the mouth. In this statement also I find that I cannot entirely agree, for it is in just those places which are predisposed to decay through the acid action of the secretions and fermenting food particles on the obscure and inaccessible surfaces of the posterior teeth, and the labial surfaces of other teeth, that gutta-percha is of greatest value, because, as I supposed, it was impervious to the action of the secretions. To be sure, the material undergoes a change, and in time needs replenishing or renewing; but that it does offer good resistance to the oral fluids I feel sure.

In the making and setting of porcelain inlays the color question is perhaps as important and vexatious a problem as we have to solve. The search for a durable and colorless cement has brought out the cellulose preparations mentioned by Dr. Head, but they are, up to the present time, of limited value. For those cases where we most need a translucent cement,—namely, on the approximal surfaces,—they lack the necessary strength.

The integrity of the attachment of the inlay to the tooth has been proved to me on two occasions in a rather unpleasant way, by having a contour filling fractured by stress of mastication, leaving a part of the porcelain firmly attached in the cavity of the tooth. This proves conclusively that if the inlay is properly grooved and set, its attachment to the walls of the cavity is all that could be desired.

The question of the durability of an inlay is one of the first that would naturally come to the mind of an operator taking up the work, and should be well considered. The statement that "a porcelain inlay is as durable only as a cement filling" is almost too fallacious to be noticed; but even when it is granted that the cement seam between the porcelain and the enamel-wall is the weak point of an inlay, we all know that the fine line of cement offers such a small surface to the action of the oral fluids that its disintegration is necessarily very slow, and after a certain length of time seems to stop altogether when the fit of the inlay is close. And it has occurred to me that this may be due to the lodgment in these crevices of a sort of sediment, which would act as a protection to the cement beneath. When the seam is found open through disintegration of the cement, it is an easy matter to wash it out with alcohol and wipe in some fresh cement, which really gives this inlay a new lease of life.

Some of such inlays have been in the mouth for seven or eight years and show no signs of failing, and if asked how much longer they would last I should prophesy that they would remain as long again.

On the other hand, if it were known that the life of an inlay were limited to a period of three or four years, there would still be many cases where an operator would be justified in using them for their cosmetic value.

On the announcement card the title of Dr. Head's paper is given as "The Philosophy of the Cemented Inlay." As he read it to us it is "The Status of the Inlay in Comparison with Other Fillings," and in explaining the status as clearly as he has done he has surely given us a great deal of the philosophy as well.

Dr. R. OTTOLENGUI. Dr. Head spoke of cellulose cement as though we all knew about it. I do not think we all know about it, and I would like to ask him exactly what he means by cellulose cement, and what evidence he has had that it will retain porcelain fillings any length of time.

Dr. HEAD. Before going into the discussion of cement I should first like to speak of Dr. Tracy's very kind criticism in reference to the antiseptic action of amalgam. I feel that amalgam does have an antiseptic power. I have known many cases where the amalgam bulged or shrunk away from the cavity to such an extent that it was easy to place the instrument between the margin and metal, but when that amalgam was trimmed level the filling still continued to preserve the teeth for years. I think this experience of mine is not an uncommon one.

I feel that fillings made of gutta-percha base-plate are practically impervious to the fluids of the mouth, but I was speaking of the ordinary gutta-percha filling-material, and that will generally, in the course of two or three years, become disintegrated on the surface. Some gutta-perchas, however, seem to have a tendency to become vulcanized in the mouth, and so last much better, taking on a flint-like structure.

I have been very much interested in the Doyle cement, and, while I cannot give it an unqualified indorsement, I feel that it is well worthy of a trial. It is a liquid celluloid.

The cavity should be absolutely dry and well undercut. The filling should be dried and undercut. The cement should be wiped over the filling and at the same time put into the cavity, when it should be dried with hot air to a thick, gelatinoid consistence. This being accomplished, the porcelain inlay should be put upon this gelatinoid cement and carried home with a hot instrument. In this way we drive off the excess of the solvent in the cement, which is probably one of the chief causes of its disintegration.

I can now recall four or five mouths in my practice in which the Doyle cement has been used with excellent results; where the translucency of the cement has enabled me to get results that would have been impossible with the ordinary oxid of zinc cement.

Dr. R. H. HOFHEINZ. In regard to the porcelain inlay, I feel that when it has left the hands of the enthusiast and the ignorant man it will certainly have a lasting place in dentistry. I have only reason to take issue with you on the question of the antiseptic property. There is no antiseptic property in any filling.

This is the day of gold fillings, either soft gold or cohesive gold, and if it is a complicated filling it is a great deal more difficult to get close adhesion than with either gutta-percha or cement. There is no antiseptic filling that is known to me. Why should porcelain as an inlay exert any antiseptic property whatever upon the surrounding enamel or dentin? I believe the distinction which Dr. Head has made is wrong. It is not the question of antiseptic property, but it is the question of relative skill which is needed in putting in a soft filling or a plastic filling and a cohesive gold filling.

In the experiments made by Professor Miller,—the only ones of which I know,—he speaks of copper amalgam having slight antiseptic power.

Dr. R. OTTOLENGUI. Considerably over a year ago this Doyle cement was sent to me with the claim that it could be used as a filling-material. I did not undertake to use it in that manner, but I did try it as a cement for porcelain fillings, and I must say that the first inlay which I set with it made me feel that the millennium was really at hand. The joint was absolutely invisible, because the inlay was one which, placed in the cavity without a cement, gave an invisible edge, and the edge was no more apparent when the Doyle cellulose was used than before.

But in my enthusiasm over this cement I set a number of inlays, with the result that in the course of from two to four weeks I had the pleasure of resetting some of them and of making others over again which had not only dropped from the cavities, but had been lost.

As an evidence that it was not the inaccurate fit of the inlay or incorrect shape of the inlay, those which were brought back to me were reset with phosphate cement, and are still in position. New ones made for the other cavities are also in position, set with cement.

In regard to the manner of using the cement, I used it exactly as Dr. Head describes, with the exception of the hot instrument. The appearance of a filling set with this cement is so good that I am willing to set one or two more and use the hot instrument to see, but I must confess that I am very skeptical as to its having any lasting utility.

Dr. Head seems to admit that it is not to be used in cavities which must endure any great strain, and Dr. Tracy makes the point that they might do very well in labial fillings, but not in approximal cavities.

Now, it is a curious thing how different the experiences of different operators are in this porcelain inlay matter. Nearly every one claims that the ideal place for porcelain inlays is in the labial surfaces, and very few, if any, seem to consider that the labial cavity is at all difficult. In the matter of retention, my own experience has been that ninety per cent. of my failures have been in labial cavities, whereas I do not remember to have lost a filling from an approximal surface which did not reach the masticating surface. One of the first of those I put in was of the old German glass filling-material set with ordinary cement, and the patient eats on it and it stays there.

I have a patient for whom I have put in large labial fillings about once a year for the last seven years, and I know of no way to make them stay any longer than that. I am hoping that the last lot, just put in, may stay fourteen months instead of twelve, and possibly by that time I may get experience enough to get them to last two years.

I want to say another word about that part of Dr. Head's paper where he speaks of amalgam in connection with oxyphosphate. It seems to me that he is somewhat in error when he alludes to the fact that when a phosphate is first placed in a cavity we have practically an inlay of amalgam. I cannot see that. I do not understand an inlay to be anything except a mass which can in its solid shape be placed in the cavity and taken out.

An amalgam filling placed over cement, on the contrary, would not come out if every bit of the cement were washed out, because there is a retentive shape to the cavity, and there is simply a thin layer of cement in the cavity. Moreover, the joint is not broken with cement, and, the filling being larger than the outer aperture, it cannot come out.

Before I sit down I want to say a word about Dr. Capon's paper. I feel to a certain extent as though I were a sort of godfather to Dr. Capon. I was the one who persuaded him, at very short notice, to come before this society and take the degree of M.D.S., and it is very gratifying to me, as one of the holders of that degree, to see Dr. Capon making his maiden effort before this society. It is especially gratifying that he should have made such a brilliant essay into the field of literature here, when I understand that his reason for not doing so before is due to the fact that "a prophet is not without honor save in his own country."

If you will look over the list of holders of the D.D.S. of any college in the country, you will not find proportionately as many men who have achieved reputation outside of their own homes as you will if you look over the list of holders of the M.D.S.; and, while I have long heard that Dr. Capon was doing well, I am very glad to find that he has come into the ranks now of the well-known and prominent M.D.S. of this country.

Dr. HOFHEINZ. I would like to know something more of the case Dr. Ottolengui has been speaking of, and whether there is not a greater amount of acid in that mouth than is ordinarily the case.

Dr. OTTOLENGUI. The history of that case is interesting, because of the rapidity of the decay. That man was in good condition and had a sound set of teeth one year, and the next year he returned with nearly one-third of the labial surfaces of the upper central incisors removed, and large portions of the lateral incisors also. In those cavities I made temporary test fillings, in order to test a medicament which was then coming into vogue,—the milk of magnesia. In the first case we made tests with litmus, and discovered the fact that he had a mouth which was acid in the daytime and alkaline in the night. With the use of milk of magnesia, combined with the fact that he went to Europe and took one of the water cures, the test fillings of gutta-percha which were placed in his mouth fitted accurately in a year, there being no evidence of erosion, which seemed remarkable in view of the previous nine months, when he had lost so much of his tooth-structure.

That encouraged me to make porcelain fillings for him, and I must say that none of his fillings have been lost through any erosive action on his teeth. The erosion seems to have stopped for several years; but this year I placed some new porcelain fillings for him—not more than three months ago—in two central incisors, and he came in lately to have the lateral incisors filled, in which fillings were placed two years ago. Those fillings which were placed in his mouth three months ago show leakage from erosion, and consequently I have recommended that he resume the milk of magnesia, and when he goes to Europe to again take the cure.

I placed fillings in the cuspids this year for the first time, and it will be interesting to know whether any erosion will have occurred in them when he returns.

Dr. M. L. Rhein. After a varied use of porcelain for filling-material and for other purposes during the past fifteen years, I must agree very strongly with the remarks of Dr. Capon, that we cannot at the present time look upon the porcelain inlay as a permanent affair.

While we all admire the beautiful porcelain work that Dr. Head has shown at different meetings, and recognize his ability to reach results in certain difficult cases, I feel that there is a danger of his taking a rather too extreme view of the value that we can hope to obtain at the present day from the use of porcelain, and at the same time I fear the effect of decrying the use of gold properly manipulated in the preservation of tooth-structure.

With some little hesitation I have taken the floor to differ with Dr. Head on this account, but I feel personally very strongly, as Dr. Hofheinz did in the remarks he made on the subject, in regard to the differences that Dr. Head claims to find between the value of gold and amalgam. If there is any deterioration in the margins of such fillings,—an effect, by the way, which should never occur in a properly manipulated gold filling, but which may not be due to the defective filling after all,—and even if such a thing should take place in regard to leakage, which would result in the deterioration of the dentin in a tooth with a gold filling, I thoroughly agree with the sentiment of Dr. Hofheinz that it is due entirely to poor manipulation of the gold in the cavity.

The amalgam, on account of the ease of manipulation, will adhere to the walls of the cavity. Too much attention has been given, in the last few years especially, to the ease with which gold can be placed in the teeth, without regard to its proper adaptation to the walls of the cavity. It is a point where the skill of the operator comes into play, and the blame cannot always be attached to the material that is used.

The main object that I have in making these remarks is that whenever anything has come into vogue as rapidly as porcelain has been brought out, since the electric furnace has been so prominently and extensively used, there is danger of going to extremes in it, and attempting to accomplish something that we may afterward regret.

Wherever esthetic or cosmetic purposes are not a large desideratum, it still remains my humble opinion that we have no material that will preserve tooth-structure as permanently and as thoroughly, and that has so few objectionable qualities, as a properly inserted gold filling.

The objection to this, as enumerated by Dr. Head, seems to be fraught with the great evil that is underlying operative dentistry at the present time, the desire to accomplish something that has been in vain sought for by the profession for a great many years,—the insertion of a filling-material without the expense of much labor to the operator. Up to the present time no one has solved the problem.

In the same light that I feel that a porcelain inlay cannot save a tooth as permanently nor as well as a properly inserted gold filling, I feel that a gold inlay cannot save teeth properly. I have seen a great many gold inlays inserted in teeth, and sometimes a most deplorable resulting condition, starting with the loss of the cement around them. I could see by the character of the work in many of them that they were well put in and well made. I knew that the man who made them was a good workman, but, as far as permanency goes, they bear the same relation to a properly inserted gold filling as a porcelain inlay would, being dependent entirely upon the imperfect and temporary effect of the cement which holds the inlay.

Dr. Van Woert. I would like to speak generally rather than to either of the gentlemen in particular, and what I want to say most, and make most emphatic, is that those of you who have not taken up porcelain work had better be careful before you do.

I think I have spent as many hours in my laboratory as almost any gentleman here working in this same line, and have tried various materials. I have worked with the same people Dr. Head worked with, and the same materials, which I found very satisfactory, but I did not often choose a fusible inlay.

I would advise you, if you care to make the experiment, to examine the inlays of any man. If you can find any of mine, examine them with a magnifying glass, and you will find them very defective. In the first place, they have got to be firm in the matrix. That will change; therefore at some one point or other there is a bad place in the inlay. The cements that we have I do not believe are adequate or fit for the purposes to which they are put.

I spoke upon this subject in New Jersey last month, and one gentleman told of where he had used a certain kind of cement and it had lasted many years. I can show you cement fillings put in my wife's mouth which have been there for twenty-three years. I have several patients in whose teeth cement fillings were placed many years ago, and they are doing good service to-day; but I could not tell you the full reason for this. It is evident that where a porcelain inlay is inserted into a tooth with space between it and the tooth, the space has got to be filled with some plastic material, and whatever that material is it is going to prove defective in some mouths.

Now I am going to reiterate another statement I have made. I believe that porcelain inlays have come to stay. I believe that every dentist wants an outfit in his office. I believe that when he starts in he must be very careful where he places them, and with the understanding that there is a possibility of its proving a failure; and if it is a failure he must not be blamed. He is taking the same chance as the patient, and surely a great deal of hard work has been done to better the materials that we have at our hand. I do not believe that it is possible to fail in making an inlay that would be what you would call perfect with any furnace, but I think a good electric furnace is the best any man can use.

Porcelain inlays placed in the mouths of people as we have been doing in the past are going to be like lots of the copper amalgam fillings placed in years gone by, and like lots of the bridges in years gone by; and if we stick to this as we have begun we will be in the same position with regard to porcelain as an inlay. This porcelain work is now stepping in to relieve us of what was wrong in days gone by, and it is attracting the attention and the manipulative ability of some of the finest men in the world in their gold work. We have very few men who stick to gold filling in these days; they are all looking for something easy to do. I am afraid to pass judgment, because I feel timorous myself; but I think a good deal of it is pure laziness.

I tell you, gentlemen, if you maintain the skill and standard of your profession, you will keep up your ability to manipulate gold, either in soft fillings, cohesive fillings, or whatever it may be.

Dr. C. S. Butler. I want to say a few words on one thought that was thrown out in the paper of Dr. Capon. I suppose in a way I am responsible for Dr. Capon's presence here, as it was upon my invitation that he consented to come, and I congratulate the society upon the presentation of such an excellent paper.

If I understood Dr. Capon aright, he advocates the use of porcelain work, among other things, for the reason that it develops a higher degree of skill and manipulative ability in the man who uses it; and it is upon just that point that I believe the enthusiasm over porcelain work will have a permanent benefit, even though porcelain inlays may sooner or later disappear.

I believe that anything which has a tendency to develop the skill of the operator, anything that is hard to do, and requires study and perseverance to accomplish, is the very thing which is doing us good, though it may in itself be of a temporary character.

Whether porcelain inlays are to be permanent or whether they are to pass away, as was suggested by Dr. Van Woert, I do not know, but I do believe that the very fact that men in our profession are devoting to this work so much time and labor is developing a higher degree of manipulative ability in the profession, and consequently, instead of suffering in our manipulation of gold work and other materials, we will as a profession be developed to a higher degree of skill in all directions; and for this reason, if for no other, I am very glad that the work is being so prominently discussed before the profession.

Dr. VAN WOERT. I want to correct Dr. Butler in one way. I said that it wanted to be used with more care and discretion than it had been used.

Dr. Head, Dr. Capon, and men of that class have a perfect right to put them where they think best, because they are skilled in that line; but others, who have paid little attention to the work, have not any right to do it. If it were taught in our colleges and made a general study in dentistry it would be different, but it is a fad taken up by a few who are accomplishing great results; and there are many dentists who have not any right to attempt this inlaying. I believe it is a wonderful thing, but I believe good soft and cohesive gold is better for the average man than the porcelain.

Dr. E. C. KIRK. I would like to call attention to two points which have been brought out by Dr. Capon, and I thank him very much for them because they will serve me as an illustration this evening; that is, with reference to the oil furnace which he has presented.

I simply want to recall what he said in regard to the oil furnace, so that I may use that as an illustration. He made it clear to us, I think, that there was a certain relationship between the focus of flame and the draught of that furnace; a certain adjustment by which he got the highest intensity of combustion. He stated that if the oil were in excess, or fell short of a certain amount, he could not get the highest focus of flame. That is the point that I want to have borne in mind, that there was a necessary adjustment between the amount of fuel and amount of oxygen in burning that fuel.

There is one other point that attracted my attention in Dr. Capon's very admirable address, and that was the enthusiasm with which he upheld the artistic side of this work. I followed him as rapidly as I could in his flights of rhetoric in regard to this matter, and then I was let down with a very sudden cold, hard thud by one remark; that is that this process which he uses was a means for saving time, and thereby putting money in the dentist's pocket, which, after all, was the thing we are working for. I do not believe that he meant to say we are working for the money. That is a secondary consideration. There is something more than that. If it is so, the problem which the correspondent will bring before you this evening has been put in vain.

I want to call attention to these two points so as to use them as illustrations.

Dr. CAPON. I thank you for the very cordial way in which you have received my paper, and I am glad I have two such fathers as have given themselves to me in this time of trials and tribulations. I feel far easier since I know I am here with a good feeling, by the kindly words spoken by Dr. Ottolengui and Dr. Butler.

I endeavored to make my paper as clear and bright as the subject deserved. I would like to take issue with Dr. Van Woert on several things he said in regard to the porcelain inlay.

I am sorry, in a way, that the only point of discussion of my paper is the one I think the least of. I dwelt on the artistic side of it, and I meant it when I said that a furnace was more to me, or as much as, the vulcanizer in my laboratory. If you take away from me this artistic auxiliary, I feel that I am expert enough with gold to keep my reputation. I do not hold that the standard of the profession is lowered in the least by a man being too lazy or too ill to put in a gold filling properly. Go through the colleges of to-day, and you will see the standard higher than ever before. When a man cannot put in a proper gold filling and looks to some other way as an easy substitute, then it is high time for him to quit.

As far as making a statement in answer to Dr. Kirk is concerned, I think he has misunderstood me. I did not take the system as a whole and say that we are after the money portion. I did not mean that all the inlay manipulation was easier. I said that that crown was made easier and can be made in less time than it takes to go down town and get a Logan crown. It is not easier in a way. I will again take exception to Dr. Van Woert when he admitted that a cement filling was good for twenty-three years in his wife's mouth. I think I made it clear in my paper that in those mouths are the very places for porcelain. Why should he cry down the fact of all inlays being no good, when the cement filling lasted in his wife's mouth for twenty-three years? I am sure porcelain would look eminently better than the cement, and would last as long.

I made a few remarks in regard to liquid pyroxylin or cellulose. I have had it in my office, and have always been afraid to use it. I am rather conservative in a way. I like to know that my efforts are likely to be successful, and I have not made a reputation sufficiently wide to try experiments on my patients. I try to be conscientious and do what is right with my patients, but have not come to the place where I can afford to experiment.

I used the pyroxylin on the plaster model which holds the samples. It is the pink color, and seems to hold very closely. The plaster was wet when I put it on the night before last, and I dare say it has a tendency to catch. I put a little on my nail, and it dried and is there yet. It is impossible to wash it off, but it will wear off in time.

The pyroxylin is very volatile. You put a good-sized bubble or drop on your nail, and in a few minutes it has gone down to a very thin film. You cannot feel it with your finger, showing the amount of shrinkage or evaporation. It is thinner than the material that you use as a matrix, thus there is a lack of material to make the attachment. That is the way I look at it.

Dr. Van Woert said that the matrix would change form in removing. He evidently pulled it out and went ahead and made his filling, knowing that the joint was not going to be good at any rate.

The system I use is, I think, reasonable. I look after the body of the cavity, and get as much undercut depth to it as possible. I think possibly the result of some of the coming out of the fillings has been in not putting enough body to the inlay instead of a thin veneer, and asking the cement to do it all.

There must be some body to the cavity that goes into the teeth, and not a mere shallow surface. I try to get as much impression as I can of the depth of the cavity. If I punch through my platinum matrix I can bridge over with porcelain, and it makes no difference to the filling when finished. Sometimes I even punch it through purposely, and force through a little bit of the body and make a little button, so to speak, to make a retention.

Now, with the thin veneer it cannot get any retention. It will soon dislodge. I think depth of cavity is what is needed most. After I get the body of the cavity properly attended to and approximate the edges, then I make a biscuit with the higher grade body. I can approximate the contour in the biscuit. I replace it in the cavity, and then attend to the edges. The platinum is trimmed away until I have a thin margin of the metal to deal with instead of a large flap. The biscuit gives something to hold it into position while I burnish the edges.

Now, when that biscuited portion is taken out, it should be done so carefully; more carefully than the first time, and I think it should be taken out with a little lifting and coaxing. Do not go at it as if it were heavy material; go at it easily, a little bit at a time. Do not try to pull it out, or you will mar your edges or change them.

A gentleman asked me to explain the tooth on the model. If I had the model I might do it more easily. It is the last molar on the left side. He noticed that it was attached by amalgam; that is a Logan crown with the pins cut off and ground off level with the porcelain. There are no dowels in it. The portion hanging was smashed purposely to show the amalgam attachment. The way that is done, if you wish to go into detail, is this: There is a slight hollow in the Logan crown, or in any crown. That hollow is used to hold a certain amount of amalgam. But, too, something must be used to make the amalgam attach to the porcelain.

Dr. Land conceived the idea of biscuiting the porcelain over the surface, which then makes it somewhat porous or rough. On that surface you paint the chlorid of gold, such as the art pupils and china painters use for china work. You paint it on possibly a couple of times, and dry it before your furnace, passing it into the muffle gradually until the tooth has become heated thoroughly; not enough to burn your gold, because as soon as you get too high heat your gold will roll up into globules.

Everybody knows the affinity that gold has for mercury and amalgam. By working the amalgam with a burnisher it will adhere to the gold, and your undercut being properly prepared in your root, you simply place one on top of the other.

I had one of these put in my mouth,—in the second bicuspid in 1890,—and I wore it until about four months ago. It was put on without a post; two flat surfaces placed together. I broke the tooth, root and all, by biting the cartilage in a piece of bacon, which necessitated my assistant building up the root until I had brought about a new foundation for the crown.

Dr. Wheeler. What is the average amount of time taken to make an inlay and put it in?

Dr. CAPON. It depends on the place it is being put in. If the access to the cavity be easy and a large cavity, I will put in two or three porcelains while you are putting in a gold one, and you are not a slow gold operator; but I may take about half an hour to put in one of those that I call easy ones. Regarding durability, I cannot account for Dr. Ottolengui's ill luck in having to replace them, other than the fact that he had not sufficient body to his cavity.

Dr. OTTOLENGUI. You cannot always get it. I want to say if you can get plenty of depth it is all right, but how are you to get depth if you have sensitive pulp?

Dr. CAPON. You should get sufficient depth to hold these inlays, even if the teeth are sensitive. There are means to obtain it, but without sufficient depth you cannot claim any durability at all in porcelain inlays. Porcelain inlay is the part of the porcelain work to which I attach the least amount of importance, because my art lies in the crown. That is where I feel I do the best work and the most good to my patients.

Dr. HOFHEINZ. What porcelain material do you use for inlays in particular?

Dr. CAPON. I always use Close's body for my first biscuit. Then often a mixture of Close's and Whiteley's as an enamel.

Dr. HOFHEINZ. Which make and which body do you consider the closest?

Dr. CAPON. I use as enamel, so to speak, either the Consolidated body or Dr. Whiteley's new body. They have given me as good satisfaction as any.

In regard to shading these, it becomes somewhat easy, and one who has experimented along this line will be able to get as many as ten or eleven different shades. Shading is not a difficult thing for me now. I do not always get them exact the first time, but I use the basal powders and change and mix them until I get what I want, just as an artist takes his palette and mixes the different colors.

Dr. HOFHEINZ. Is not the shrinkage more in some of these than in others?

Dr. CAPON. The higher the grade the less shrinkage. The Close's body does not take as fine a finish as the others. You can get less shrinkage, because the water will be taken away far more readily than it will with the finer ground bodies.

Dr. HEAD. I should like to ask, regarding Dr. Ottolengui's remark that an amalgam filling put in with cement is not an inlay, if a gutta-percha filling is not an inlay? I should like to ask what filling is not an inlay?

Up to the present time, of course, it has been customary to refer to a whole piece cemented into the tooth as an inlay, but it does not make any difference how the metal is placed in the tooth, as I only had reference to the relative position of the inlay to the tooth when I spoke of the amalgam surrounded by cement. The manipulation has nothing to do with the case in point. I was speaking of the final result.

I would bow to Dr. Hofheinz. He is a German when he speaks of Dr. Miller, to whom we all take off our hats, for we know that Dr. Miller has done very much for the profession.

Dr. HOFHEINZ. Dr. Miller is an American, by the way.

Dr. HEAD. But he is in Germany. Dr. Miller, in my opinion, has, if I am not mistaken, in his book spoken of several fillings as having antiseptic properties.

Dr. HOFHEINZ. He has spoken of one special make of filling, and not several.

Dr. HEAD. When we come to speak of the antiseptic property of a filling-material, we have to look at it from two points of view. Germs are dangerous, first, from the number present; second, from the position of the germs wherein they can exert their greatest activity. The fillings exert an antiseptic action in two ways: First, by excluding the germs; second, by placing the germs that do enter the margins so far from their base of supplies that they are like an army without its commissariat; and thus many cement fillings that will allow bacteria to penetrate the substance of the cement preserve the teeth, because they isolate those germs from the necessary nourishment. Thus gutta-percha preserves teeth in a similar manner.

If Dr. Hofheinz will take a wet tooth, dry the cavity well, and, having inserted a gutta-percha filling, drop that tooth in anilin ink, he will in five minutes find that the ink has penetrated between the cavity-wall and the gutta-percha. If the gutta-percha allows the ink to enter, it will probably allow germs to enter.

Such being the case, how can we explain the preservative power of gutta-percha, except by confessing the possibility of its removing the germs from their sources of supply?

My experiments, published in the *International Dental Journal*, June, 1895, are not to be placed in the same category as those of Black and Miller, but, until they are disproved, they will have to stand. I took cements of oxychlorid of zinc and oxyphosphate of zinc, and placed them in baths of bacteria. In five to eight minutes this cement that had been preserving the teeth well allowed the germs to pass quite through it. I know that Dr. Ames has a cement now that he claims is water-tight, but the only point I now wish to make is that the cement which all of you have been using with beneficial results has been of itself permeable to bacteria.

I will now speak of Dr. Rhein's remark, where he said that the trouble lay not with the material, but with the poor manipulation. I do believe that we can justly talk about the incompatibility of gold with tooth-structure; that we can talk about the bacteria here and there, but doubtless in many instances tooth-decay arises from faulty manipulation.

But, even granting all this, we should not take a position which places us superior to Divine Providence. Granted even that our fillings are put in with such perfection as to make the edges just as strong and as perfect as the tooth was originally, has not the work of Divine Providence failed? And even from the lofty pinnacle of dentistry, by putting in one little plug of gold, can we claim that the decay which started when that tooth was perfect may not start again?

I would also like to reiterate what seems to have escaped the notice of most of those who have discussed my paper,—where the tooth is capable of bearing a good gold filling there is no other filling so good. And I would further add that anybody who takes up porcelain work that he may have an easy time will give it up altogether in three months.

Dr. HOFHEINZ. Dr. Head said that we must distinguish between fillings that destroy bacteria and fillings that retard the growth of bacteria. There is no such thing as a filling which will destroy bacteria.

Dr. HEAD. I said in the antiseptic power. I do nct know of any filling-material that will destroy bacteria.

Dr. HOFHEINZ. I know of only one that will retard the growth,—copper amalgam. Perhaps, as you were not a German, it was even a misuse of language. The question why gutta-percha or cement which Dr. Wedelstaedt has perfected so well is penetrable by moisture and still saves a tooth, is a poor argument. The physical condition of that filling is all that saves that tooth, but there is nothing that I can conceive of that would give to that filling an antiseptic value.

Dr. HEAD. I never said gutta-percha was penetrable. That is simply slight shrinkage between the walls of the gutta-percha and the cavity. I know that Ames and Wedelstaedt both claim that they have impermeable cement, but I have never seen it.

Dr. HOFHEINZ. I only wished to make a protest against the antiseptic value.

Dr. HEAD. They are largely, if not entirely, antiseptic in the power they have of precluding the growth of those germs that are shut off from nourishment.

Dr. HOFHEINZ. They cannot get food in that filling-material.

Dr. HEAD. Supposing it was a cement that allowed the germs to enter?

Dr. HOFHEINZ. It does not allow the germs to enter.

Dr. HEAD. I thought you admitted that oxyphosphate of zinc allowed the germs to enter.

Dr. HOFHEINZ. I simply said that the fluids of the mouth were allowed to enter.

Dr. HEAD. I can only say that hollow balls of cement thoroughly sterilized were dropped into a bath of bacteria, and the moisture leaked through in the course of time. This moisture was examined, and was found to contain bacteria of the same order that was in the bath outside, and this same cement had been preserving the teeth.

Dr. HOFHEINZ. To an extent, as all cements do; to an extent. I only wanted to say in regard to nationality that, although I am a German, I am a German by accident; but I am an American by choice, which you are not.

Dr. HEAD. And I am an American by choice, and would not think of being anything else.

Dr. OTTOLENGUI. Now that the war between Philadelphia and Germany is over, I do wish that you would give me a chance. Dr. Head took me up on the point of an inlay. He is altogether wrong about gold fillings. What is an inlay? The word "inlay" applies to specific things outside of dentistry, and it has been applied technically to very specific things inside of dentistry.

Now, as to inlaying. For instance, an inlaid piece of wood is one in which a pattern has been cut and other pieces of wood have been placed to fill in the pattern by the contrast of different kinds of wood. An inlaid table, commonly so called, is a similar structure. Various parts of marble are put together in the same way, and in one class of inlays, where everything is of the same kind, small pieces put together, it has been termed a mosaic.

In connection with dentistry, the word "inlay" has come to mean a filling made approximately the size of the cavity and placed in that cavity, cemented with something that breaks the joint.

An amalgam filling or a gold filling we place in a cavity in a plastic condition. The gold filling is a plastic filling because it is numerous small pieces put together, and held by cohesion inherent to the particles; and the especial peculiarity of both amalgam and gold is that, being placed in the cavity in a plastic condition, they can be placed into a cavity from which they cannot be mechanically removed in an unbroken mass.

There is no inlay of any kind, whether of wood or stone, or porcelain filling or gold, that cannot be mechanically removed from the place into which it is put, and I take issue with him when he calls an amalgam filling an inlay, because if the phosphate were removed the amalgam filling would not come out, being larger in some portions than is the orifice of the cavity. Moreover, it is not held by the cement, and the cement does not break the joint. It is in that connection that the great difference is made in my mind.

The weakness of porcelain and gold inlays lies in the fact that the joint is of a material which is destructible by the fluids of the mouth. That is not true of an amalgam filling which has phosphate underlying it, and therefore I say again Dr. Head makes a mistake when he calls that class of fillings inlays.

Dr. HEAD. Wherever gold is put in in a plastic state, you say that is an inlay. Then would you call the gold put in the Damascus steel instruments inlays or not? For instance, over in Spain they have iron and steel tablets with gold letters put in them. Would you call those inlays? That is an arbitrary statement which you are making. These things are called steel inlaid with gold, and the gold is put in just as we put in gold fillings.

Dr. OTTOLENGUI. I do not think that it is inlaid with gold, and, even if it is, that is not dentistry. I do say that the word "inlay" has a definite technical meaning in dentistry which does not apply to other things.

Dr. HEAD. If gold put in in a plastic state only applies to dentistry, I did not know it. I can only say if Dr. Ottolengui finds fault with the question of inlays and the definition, I think the entire meeting undoubtedly understands what he means and what I mean.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held at the Academy of Medicine, No. 17 West Forty-third street, New York city, on Tuesday evening, May 15, 1900; the president, Dr. W. W. Walker, occupying the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. JOSEPH HEAD, of Philadelphia. As this is the time for relating incidents of office practice, it might be interesting to speak of a plan that Dr. C. N. Peirce has of getting rid of chronic swellings at the tips of roots.

We all have difficulty sometimes with teeth that seem to have been well treated, but which, at the end of two or three months, develop chronic swelling at the tip that gives us a great deal of annoyance. Dr. Peirce treats these by taking a long spear-pointed drill, and, instead of going through the alveolar process opposite the tip, he starts at the neck of the tooth and follows the root all the way down, until he feels the spear-pointed drill enter the little pocket.

I speak of it to-day because I have a confession which, in the presence of all these gentlemen, is very hard to make. I inject local anesthetics. I use a one per cent. solution of cocain in such a way that the tissue becomes white. If the injection is started at the free margin of the gum and gradually injected, and the white creeps down toward the tip of the root so that the fluid enters the gum and the bony structure without lifting the periosteum, thorough anesthesia can be obtained without subsequent danger of sloughing or necrosis.

If we can safely use local anesthetics and relieve the patient of the pain of the minor operations, such as lancing or the opening of little pockets, the expense and trouble of a gas outfit will be saved; though ordinarily, when I have a pulp to extract, or any operation of a more serious nature, I invariably escort my patient down to our illustrious friend Dr. Thomas.

Dr. J. F. P. HODSON. I would like to ask Dr. Head what the particular object is in entering the gum where he does, at the neck.

Dr. HEAD. The object is that it can be done with much less pain, and there is no difficulty in getting through the tough tissue of the gum. The bone is reached at once, and, while at a glance it seems a much more difficult operation than lancing through on the outside, it has been my experience that it is much less painful to the patient.

Dr. M. L. RHEIN. I want to ask Dr. Head whether he used that means for regular blind abscess.

Dr. HEAD. Yes; and it has been my experience that blind abscesses readily heal under this treatment. No other means seems to be so satisfactory, although, of course, when one enters from the outside farther up good results are obtained.

Dr. Rhein. How do you get rid of the necrosed material that is present in a blind abscess?

Dr. Head. I was not speaking of cases where there is true necrosis of the bone. I was speaking of cases where there is a little dead membrane, and which are susceptible to drainage. If this is not sufficient, of course other measures are necessary.

Dr. Rhein. If I may speak on this subject a moment, I would like to say that I think the method that Dr. Head has spoken of has advantages only in a very small percentage of cases, but not in any case that I would term a chronic blind abscess. There are some cases of acute abscess without a devitalized pulp, such as was presented to us by Dr. Kirk at the State Society last week; but I should be very loath to depend upon an operation of this kind for the cure of anything in the shape of an alveolar abscess, which necessarily involves a more or less amount of necrotic tissue.

Whether the bone is involved is not a matter of great importance, but the end of the root is necessarily involved in this necrotic condition, and also some part of the apical region. Too much of this kind of treatment has been practiced in the past ages of American dentistry to permit the practice to be recommended broadcast without subjecting it to criticism. In other words, the cure of an abscess in this condition is only feasible by the radical surgical method of cutting off the end of the root and removing all the necrotic tissue. It remains the option of the attending surgeon whether he prefers or thinks it advisable that his patient should travel around for a great many years with a pus-producing focus that never heals, or whether he will proceed with a radical operation which will absolutely remove and cure the abscess. My own practice in such cases is to tell the patient point-blank that he has one of two choices, either to have the abscess radically cured by surgical operation, or to have the tooth extracted; because I personally am more in favor of having the patient lose the best tooth he has in his mouth rather than have him carry it around producing pus for the rest of his life.

Dr. Head. I quite agree with your statement whenever there is an active formation of pus, but I refer to cases where there has been an abscess and a little hard swelling of lymph remains at the root.

The great beauty of this operation lies in the fact that the pockets can be very readily found, because the surface of the root can be followed; whereas if we go in at the side sometimes we reach the pocket and sometimes we do not.

In working on a case where there is true necrosis, I fully appreciate the fact that the tip of the root should be amputated.

Dr. Hodson. I do not quite agree with Dr. Head in supposing this to be a very simple operation. It seems to me a very serious proceeding to cut away the gingival margin of the gum, for if it ever heals at all it is likely to cause a pulling away, so as to expose the root very largely, necessarily making a bad appearance. Even supposing it accomplished its purpose, I do not see the necessity of doing such an operation.

Dr. Geo. Evans. I would like to ask Dr. Head how he follows the root.

Dr. Head. I start at the neck of the tooth and follow down the pericementum in between the bone and the tooth; and, while it may seem a difficult or large operation, if any of you try it you will find it is one of comparative ease. As for its being an operation that entails the ripping of the gum from the neck of the tooth, the small spear-pointed drill used does not seem to have such an effect.

Dr. Evans. With a spear-pointed drill I should think you would drill away considerable of the bone. Would not a round, flexible drill be better than a spear-pointed one?

Dr. Head. It has been my experience that when the abscess heals up the bone seems to me entirely renewed.

Dr. Rhein. I would like to add one word to this discussion. Dr. Head spoke about entering way up near the apex, if we did enter through the alveolar portion. Now, this is just the point: that should never be done. In order to operate in such a case it is necessary to enter some distance below the apex of the root, considerably nearer the neck of the tooth, in order to be able to remove all the diseased portion of the root and relieve the pus that is creating pressure there. Such an operative measure as this is absolutely necessary if you want to effect a cure.

Dr. Head. There are three or four patients coming to me whose teeth behave very badly. Sometimes this lymph will collect at the tip of the roots. This has been practically the only operation needed to make those teeth comfortable. Amputation in times past has accomplished the same result, but amputation has almost invariably been accompanied with greater pain.

Dr. S. Ormond Goldan, of New York, then read the paper of the evening, entitled "The Administration of Anesthetics in Dental Surgery," which is printed in full at page 984 of the current number.

Discussion.

Dr. M. L. Maduro, of New York. I am very glad to have the opportunity to speak here to-night on this most interesting subject. It has been one of especial interest to me for the last few years, since I have been working in this department. I have come to-night at the invitation of one of the members of the society to discuss this paper, principally for the reason that I should like to demonstrate an apparatus of American make which I wish to show in substantiation of the fact that an American instrument can be, and generally is, superior to all others.

There is absolutely no reason why expense should come into the question here. The ingenuity of the American is an established fact. The products of the manufacturer represent the highest type in this country, so why should we send abroad for an article that is a shade inferior just because one pays a little less?

In discussing this able paper of Dr. Goldan's I would like to state first that I think he has spoken a little too much about chloroform in regard to dental surgery. It really is an anesthetic that should not be used at all in dental work, and the less said about it the better. It is an extremely dangerous drug, and causes paralysis of the vaso-motors. Dr. Hare, of Philadelphia, has explained that fully.

The question that comes before you as dentists particularly is the use of an anesthetic for an operation that lasts beyond the ordinary extraction of a tooth; that is, anything over one or two minutes. Of course, you all know that nitrous oxid is the safest anesthetic. What course should be pursued if you have to use an anesthetic for a longer period? There are three courses open to you:

First. The administration of gas, with the patient *thoroughly unconscious,* and the cone taken away at intervals from the face.

Second. Allowing the patient to come out of the anesthesia and replacing the cone.

Third. The administration of ether, with a little of the gas.

Undoubtedly the last method is the best, if one can arrange to have the patient remain in the office for a little while to get over the effects of the ether administered.

Ether combined with gas is the safest anesthetic we have to-day. It is the ideal anesthetic we possess, and the method that will bring about anesthesia in the way that I shall speak of to-night, with this apparatus, is the best, because it is the simplest.

The position of the patient is, as Dr. Goldan told you, of extreme importance. He mentioned that the recumbent position is not detrimental. In dental surgery I am of the opinion that it is. One should assume the sitting posture, for the principal reason that the operation may be bloody, and the blood may trickle down into the larynx and cause asphyxiation.

There are certain accidents that occur to dentists that the anesthetizer has to look out for, such as fragments of teeth chipped off and loosening, artificial dentures and instruments that will break, because he is responsible for anything that might occur.

Dr. Goldan stated that rebreathing was impossible in an American-made apparatus; that is, rebreathing of the gas after administration. That is not so in this apparatus, as you can easily find out.

Vomiting in connection with anesthesia is an occurrence it is impossible to predict. Every case in this respect is an individual one. No man can judge his experience from a number of cases. He may go on with many cases with no bad results, and then have one that might be detrimental. One has to be on guard constantly, and statistics are very uncertain in such cases. In my experience the presence of this vomiting has been almost invariable.

It has been stated that one of the good qualities of the Schleich anesthetic was its freedom from vomiting, but in a series of one hundred cases I reported in Philadelphia, in fully thirty-five per cent. of them vomiting was present, and that is something that other observers bear out.

This apparatus that I show you now is an ideal one invented by Dr. Bennett. I think it the best in the market. It is a little expensive,—forty-five dollars,—but is worth the money. Its great advantage is its compactness, and its consequent ease in being carried from place to place.

This first part is the ether chamber, which is a part of the whole instrument; charged at first with ether vapor, about a dram, and fitted to the gas chamber, so that one has the great advantage of changing from one to the other insensibly, and not getting the extreme asphyxial symptoms of gas, as might occur were the parts separate.

The great point in the administration of this anesthetic is the proportioning of the quantity of air and ether. That is the science in the matter, and, as every case is an individual one, there is always something to learn. Some patients require more air than others; some take more gas, so that you must grade it accordingly.

When you start gas administration the ether is closed, and the patient cannot smell any of the ether at all, although the ether receptacle is fully charged.

An ordinary administration will proceed in this way: The face-piece is applied closely, and the patient is told to breathe deeply through the nose, and with regularity. The anesthetizer watches the regularity of the breathing through the valve, and at the right moment puts on the gas. The patient is allowed to inhale the contents of the bag, which holds about two and one-half gallons. When that is completed rebreathing is made to occur by shutting off the valve, and at the same time an infinitesimal amount of ether is "screwed on" by the adjustment shown here; and little by little that amount is increased to the full quantity. At the time of the beginning of ether administration the patient is thoroughly unconscious,—average time fifty seconds,—and after ether is completely turned on secondary anesthesia is said to take place,—average time two minutes. Then operation can begin. The regulation of air is such an important factor that the "know how" distinguishes the good from the indifferent anesthetizer.

Dr. J. D. THOMAS, of Philadelphia. I feel that I am called upon to talk about a subject of which I know little or nothing. Dr. Goldan's paper and the discussion have been upon the combination of nitrous oxid and ether. I use nitrous oxid alone, though I have repeatedly, for general surgery, started the anesthesia with the gas, to be continued with the ether in cases which did not take kindly to the ether in the beginning, and it has acted beautifully. I do not think chloroform should ever be applied for operations in a dental chair or the sitting posture. There are patients upon whom it has a specific effect by depressing the heart-action. It is a matter of individual idiosyncrasy. In the case of a friend the placing of a bit of cotton saturated with chloroform in a cavity brought about a condition of syncope, from which he did not recover for nearly half an hour.

Ether is regarded as safer in general surgery, but it is not desirable for dental operations, such as extraction or drilling into pulp-chambers, because of the time required from beginning to recovery.

In nitrous oxid we have, I think, undoubtedly the best anesthetic for dental purposes, for we can take a patient to complete unconsciousness in about a minute, and have him recover in about the same time without the least after-effects, and I have had about fifty seconds' duration of time to perform the operation; and if each second is utilized a good deal can be accomplished in that time.

In giving anesthetics we ought to comprehend just what the condition is that we are producing. Physiologically, a patient under anesthesia is in precisely the same condition as a person under the influence of alcohol to the like degree. The effect of alcohol is to produce first stimulation, exhilaration, intoxication, stupor, unconsciousness, and, if pushed far enough, death. The effect of anesthesia is to produce the same results in the order named, only in the one case they are produced by alimentation and in the other by inhalation. And to my mind the administration would be accompanied with less unpleasant symptoms and probable fatalities if this fact was more generally recognized, and administration carried only to the point of unconsciousness sufficient to avoid reflex, and held there by the admission of more air; and not carry it, as I have seen done, to the fullest and profound state, bordering near to the line of dissolution.

Dr. Goldan has shown us a very complete apparatus for the giving of nitrous oxid and ether combined with oxygen. It seems to me a little complicated, and I cannot comprehend what possible use is the measurement by percentage of oxygen admitted except as a matter of record after you have finished, as no one can possibly tell beforehand what per cent. of oxygen this or that patient will require; and, besides, I do not see the utility of oxygen any way when we have a bountiful supply in its natural state in atmospheric air.

I condemn the hood or face-piece at all times. To my mind, it is the worst device ever introduced in the administration of nitrous oxid.

Nitrous oxid is composed of oxygen and nitrogen, which do not separate at the temperature of the human body; therefore it is practically an inert gas, producing the dual effects of anesthesia and asphyxia. In some cases of plethoric habit and florid countenance asphyxia will be first apparent, and this is shown most quickly by the color of the blood, as seen through the lips; and with these concealed from view it is a happy-go-lucky chance to tell when is the proper time to admit the oxygen or air.

Practically all fatal cases have occurred by asphyxia, shown by suspension of the respiratory effort, the heart's action continuing from ten to fifteen minutes afterward; and they have all occurred under the face-piece.

There are people whose blood never seems thoroughly oxygenized, the respiration seldom exceeding twelve to fourteen a minute. These people are particularly susceptible to the asphyxiating effects of nitrous oxid, and their lips should never be unexposed, so you can watch the approaching discoloration and immediately relieve it by admitting air.

Dr. H. D. HATCH. I had the privilege in my student days of having a preceptor both in medicine and in dentistry, and during three years of my dental pupilage I assisted in the administration of chloroform daily; sometimes three or four times a day. I saw no accident during that time, and my fear or dread of chloroform passed away and has never returned. I believe chloroform has its place in oral surgery, and can be used by those who understand it and are thoroughly on their guard. I do not believe any patient ever dies under chloroform without first exhibiting some premonitory symptoms to the man who is carefully watching for such symptoms.

Dr. Goldan says that so-called vitalized air—that is, combinations of chloroform and nitrous oxid—should never be given. He sits down on it hard, and seems to think that settles it. Any one who has had experience with pure nitrous oxid and pure chloroform is familiar with the difference in the action of the two. With nitrous oxid there is cerebral hyperemia; the brain is filled with blood; the face shows it, and the upright position is admissible. With chloroform we expect pallor, and all authorities agree that the recumbent position should always be maintained.

It seems to me that here are two anesthetics so balancing each other that with discretion we can use chloroform and nitrous oxid in these cases that Dr. Thomas spoke of, where the patient is plethoric and in strong men who have lived outdoor lives. Take three or four drops of chloroform to about seven gallons of gas, according to the patient, not using more than fifteen drops in all, and you will get enough of the effects of the chloroform to balance the effects of the gas, and the anesthesia will be more smooth and a little more lasting. You will get anesthesia before the patient has time to develop symptoms of asphyxia.

Another subject that Dr. Goldan touched upon is the sudden change of posture; that is, one should not change from a recumbent to a sitting posture, especially with chloroform. With nitrous oxid the practice of suddenly getting the patient up and to the wash-basin is a very bad one. The only case of death under nitrous oxid that I have had intimate acquaintance with occurred at the wash-basin. There was one reported at the county medical society this winter as occurring in Philadelphia. The patient developed bad symptoms at the wash-basin. It was reported as being a cerebral hemorrhage from rupture of an atheromatous artery. The patient has no business at the wash-basin at that stage; leave him in the position in which he takes the anesthetic until the lips have resumed the normal color.

The matter of fright is a very important one. Of course, we all know that shock and fright should be avoided in every possible way. I have known of one case where a patient died in a dental office. No anesthetic had been given; the patient simply passed away while sitting there in the office.

One thing should be impressed upon all dentists. I think they are sometimes negligent in not always providing everything that is necessary in case of accident. If a dentist uses an anesthetic, nitrous oxid, ether, or whatever it may be, he should have in his office and *ready to his hand* all the modern approved appliances and drugs necessary for resuscitating the patient, and should know how to use them.

Dr. THOMAS. I am glad that Dr. Hatch has referred to the case in Philadelphia, as it gives me an opportunity to explain how it occurred. It was not a case of death under nitrous oxid at all. The gentleman was a personal friend of mine, and had taken the gas upon three previous occasions and there was no apparent indication that he should not take it again. The gas was given, and the right upper second and third molars were extracted. His recovery was complete in the usual time, and he rinsed the mouth with a tumbler of water while sitting in the chair. I had gone to my desk in another part of the room, and he arose from the chair and walked to the washstand ten feet away, filled the glass, and returned to the cuspidor beside the chair and continued rinsing the mouth while standing, conversing with me in the mean time. This he repeated until he had used three glasses of water, occupying at least twenty-five minutes; after which he stood before the mirror, and with his right hand drew back his lips and endeavored to see where the teeth had been taken from. As he removed his hand he looked at it, and said, "That hand feels numb." He looked a little pale, and, as my first thought was that looking at the wounds had made him feel faint, I directed him to lie down upon the couch while I proceeded to get him some brandy, and then I realized that his speech was thick and indistinct. Physicians were immediately summoned, and everything was done to save him, but he died about four hours afterward. The coroner's jury gave their verdict as death from apoplexy, and that the gas was not the cause of it, in accordance with the medical testimony given them.

The gentleman was certainly in such a physical condition that any exciting cause might have produced the same effect, and his taking the gas was but an incident leading to that effect.

When we think of the many cases of sudden death with people apparently in good health which occur on the street, on the cars, or at their homes, and take into consideration the nervous condition in which the many thousands who have taken the gas approach the dentist for extraction, it is really wonderful that there have not been numerous deaths either before or after the operation.

In my own experience I made an appointment to go to a gentleman's house to administer the gas, say to-morrow at nine o'clock, and he died during the night preceding. Another came to my office suffering from grip, and I refused to give the anesthetic, but advised his return home, and promised to go to the house in a few days, when I wanted his physician to be present. He died the next day, and another similar case died the second day after. Therefore, I repeat that it is a great wonder we do not have more of such results happening.

Dr. Joseph Head. I would not speak before such experts on this subject if I had not had some practical experience in nitrous oxid gas.

Some years ago I was interested in the manner in which Dr. Thomas administered gas, and I went one day to his office to determine if I could not in some way or other distinguish when I went under the anesthetic. I sat in the chair and looked at a certain tree in his back yard while I took the gas. I looked and looked, and then seemed to wink my eye once, when he said, "Joe, wake up." I said, "You haven't put me under." "Yes I did," he answered, "deep enough to take out ten teeth."

I came down again the next day, and said, "I want you to give me a great deal this time." I sat there and looked at that tree again, and again I winked just once, never knowing how deeply anesthetized I was. Since then I have felt that I am somewhat of an expert; not in giving gas, but in taking it.

About a year ago at the Pennsylvania state meeting Dr. Cryer was showing an excellent apparatus for giving gas and oxygen. The patient to whom he was giving the gas was somewhat nervous. Dr. Cryer looked around pathetically, and I offered myself as a victim, and so proceeded to take the gas and oxygen. All at once a tremendous oppression came on my chest. I began to feel as if a great hand pressed on me, and I sank down to the bottom of the sea. When I regained consciousness I had nausea, and didn't get over the effects of the mixture for an hour. I do not know how long I was under it, but I do know that the effect of the combination of oxygen and gas was extremely uncomfortable; while in the hands of Dr. Thomas I took the gas and went into perfect narcosis with all ease. Dr. Cryer said that perhaps the pressure of the oxygen was too great, but I thought, for practical purposes, that I should prefer to have my oxygen given to me in air.

Dr. GOLDAN. Gentlemen, you heard Dr. Maduro's remarks about the apparatus. When I spoke of the free-breathing method I had reference, of course, to the old style of nitrous oxid apparatus that you are all familiar with.

He spoke about the matter of expense. Everybody is not an expert in giving anesthetics. To say that the question of expense does not enter into it is one of the statements that I find is not entirely true. The question of expense always comes up, judging from the number of inquiries received by me; and I think that the apparatus which is the simplest is the best. For that reason I really made up the apparatus without valves, and without any other devices to take the attention away from the patient.

If we examine the apparatus Dr. Maduro spoke about we see that it is almost an exact copy of this. That is Hewitt's, simple, ready in all cases. This revolves through a vertical axis. In that apparatus you cannot give ether for the dentist, permitting him at the same time to work. We are not speaking of general surgical operations.

What I am trying to bring out here is to permit the dental operator to do all his preparatory work,—that is, his extractions, his painful operations, opening abscesses, removing necrosed bone, preparing the teeth for filling; then doing all his other work at other times.

I have a patient in my own family who is very much perturbed about getting some teeth filled where work has to be done under the gums. My method is to permit the anesthetic to be given and let the operator do his work at the same time.

When I spoke of the recumbent position, it was with chloroform.

I would not give it in any case without there was a contraindication to the other anesthetics. I have changed from gas to ether, and then changed to chloroform.

As far as blood going into the larynx is concerned, with properly made sponge-holders and the anesthetist acting as an assistant, that can be almost entirely obviated. A little piece of wide-meshed gauze can be made and tied at each end with a string; it does not interfere with operator or anesthetist, and catches any fine particles.

As to the vomiting, there is a large number of surgeons for whom I administer anesthetics, and I have kept particular note of the patients who vomit and those who do not. The surgeon will almost always tell me of such and such patient's return to consciousness and the symptoms, and I find that persistent vomiting from ether is exceedingly rare. Sometimes they vomit mucus. Go back in the afternoon and see them after an operation in the morning, and in many instances you would not know the patient had been operated on at all. If you can restrict the ether you can get an ideal narcosis, and very little vomiting. It is not the anesthetic; it is entirely the man who gives it.

I might show you this apparatus with the Clover ether chamber, to show you how to get air. No apparatus ever gotten up equals it. We know that the larynx is no larger than this air valve; if you open it you can get all the air required. If I wish a patient to breathe back and forth into the air-bag, I have them take ether and carbon dioxid. If I want air any other way than that, I simply take the inhaler from the patient's face, and can get all the air needed. If I want to simply leave this as it is, I take it off the face entirely. It is generally my method when I desire the patient to breathe air to take the inhaler off the face when I use this apparatus.

The Barth-Clover apparatus complete, with the bag and tubing, costs the importer, with forty-five per cent. duty, thirty dollars. It is not only the best, but the cheapest. It has fluid ether only, instead of having the ether poured on the gauze, though there is no objection to using gauze.

Regarding Dr. Thomas's remarks, I might have brought over and shown him a face-piece in which you can see the patient's lips. It is made of celluloid. You can see the lips and note the color just as you would with glass. It is quite an improvement over the rubber or metal mask.

Regarding the question of percentage in oxygen, of course what Dr. Thomas says is true; you cannot gauge your percentage, and do not know when you have enough. I regulate the quantity of oxygen entirely by the effects on the patient. I give gas first for a few seconds. In general surgical work I can do that. If the patients are getting too much gas, they become cyanosed about the face and the ears. Again, if they get too much oxygen, they become conscious. In surgical cases anesthetization by gas and oxygen is a very difficult thing to do, and requires very great skill. I have done it often, and never had to stop the anesthesia on account of giving the patient too much nitrous oxid.

In dental work, in giving gas and oxygen, you give it until the patient is anesthetized. You get about the same anesthetic period that you would with nitrous oxid alone.

Of course Dr. Thomas's remarks were particularly for extraction purposes, or operations that took about that amount of time. *I have reference to operations where the surgeons do all the painful work at one sitting, and I think that a great advantage to the patient.* This is, I think, the coming advance in dental surgery.

As far as chloroform is concerned, in using it mixed with gas in healthy and plethoric patients we know there are many fatalities occurring in healthy people where no pathological condition was manifest. This method has never appealed to me, and I do not see how you can regulate it. We know that if chloroform is given too suddenly it is just as bad as giving a large quantity of it, and it is certainly not to be advised.

I understood from the case mentioned, where the patient died in the dentist's chair in Philadelphia, it was five to seven hours after the patient was anesthetized.

Another case has come to my notice, a puerperal case, in which the patient had become conscious and was free of all traces of nitrous oxid. The operation was finished; the patient had good color and appearance; respirations were normal, pulse normal, everything good; and just when the operator was packing the uterus with gauze the patient's pulse gave way. That is a different death from that which usually occurs with nitrous oxid. He supposed it was a case of cardiac thrombus, due to breaking up of a clot in one of the uterine sinuses.

I do not believe that in the case mentioned, of the man who died in Philadelphia, nitrous oxid had anything to do with it. The patient would probably have died at that time whether he had taken gas or not. We ought to make that distinction between deaths from anesthetics and deaths which occur from various other causes while under the influence of anesthetics. It is a curious thing that patients who take gas and oxygen are often very much more excitable than those who take gas alone. I do not think cyanosis is in itself a bad thing, if not carried too far.

If oxygen is given too suddenly it will occasionally produce those sensations of oppression and nausea mentioned by Dr. Head.

Adjournment.

W. J. Turner, M.D., D.D.S.,
Editor New York Odontological Society.

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

(Continued from page 930.)

Discussion on Dental Education.

Dr. M. H. Cryer, Philadelphia, regretted that a spirit of fault-finding with the medical profession ran through several of the papers for their treatment of the dental profession. In his own intercourse with physicians he had not found much of any such feeling toward him as a dentist. He questioned, on the other hand, whether the dental profession was as ready to be just and courteous to the medical men as they should. Do not all of our state laws exclude medical men from treating diseases of the mouth? In Rhode Island recently a physician, a graduate of the medical department of the University of Pennsylvania, was arrested for doing dental work without having taken out a license to practice dentistry. He claimed that by virtue of his education and his degree he had a right to treat any disease of the human body, and the courts decided that he had that right and released him.

In Pennsylvania the law, if it could be enforced, would compel a physician to take a course in dentistry before he could treat a case of pulpitis. Dentists therefore should be more generous and more reasonable in their treatment of physicians before they made so many objections to the attitude physicians hold toward them.

Dr. J. L. Williams, Boston, said that in the case in Rhode Island that Dr. Cryer mentioned, the judge quoted some dozen precedents for his decision of former similar cases, also the laws of certain states to uphold the decision which he made.

The papers which we have heard all tend to prove the need of a sound medical education as the foundation of a dental practice. This is not new, but rather a reversal to original conditions. In 1844, when he wanted to study dentistry, he found no reputable dentist who would accept him as a student unless he would first study medicine, and he therefore spent three years getting a medical degree before entering into the study of dentistry. This shows that dentistry even at that time was considered by many as a specialty of medicine, and that it was recognized that a dentist should be grounded in the general principles of medicine and know how to apply them to his specialty.

In 1876 the American Academy of Dental Science passed the following set of resolutions on this subject:

> "Whereas, Dentistry is a specialty of the science of medicine,
>
> "*Resolved,* That a thorough medical education is essential to the most successful practice of it.
>
> "*Resolved,* That we deem it expedient and for the best interests of the practice of dentistry that existing medical schools enlarge their courses of instruction so as to include efficient instruction in the specialty of dentistry, in order that it may be placed on an equality with other specialties of medicine."

In 1890, when he was chairman of this section, in his opening address he used these words, "In earlier years there were only a few qualified practitioners who devoted their skill to the treatment of the oral cavity, while the larger number gave their attention to the teeth, and so the specialty was called dentistry; but at this day, when the knowledge of the principles of medicine and surgery is more general than formerly, and more commonly made available in the treatment of the oral cavity, and with reference to the influence of the health of the mouth on the health of the system, the term dentist seems to be too limited," and suggested the use of the word oristry instead. Stomatology has since then been adopted as a better name for the specialty whose field is the mouth. He was glad that the whirligig of time is bringing around the idea that the knowledge of all the basal principles of a medical education is necessary for a dentist. It does not so much matter what the title is that distinguishes the profession, so long as the members have the knowledge necessary, but it would be better to all have the medical degree as a guarantee of the possession of that knowledge. Many of the members of the dental profession already have it, yet many excellent dentists have only the single degree of D.D.S. It, however, is true that no specialty of medicine can be separated from general medicine, for the body is one and all parts are sympathetic with all others, and without knowledge of all the diseases of one cannot be properly treated.

Dr. JAS. MCMANUS, Hartford, Conn., had been interested in all the papers, especially the one read by Dr. Davis. He had had the pleasure in 1865 of hearing Dr. Davis read a paper on the same subject in Chicago. He thought Dr. Davis raised the proper sentiment at that time, and he has lived up to it ever since. Men active in educational work in the profession of dentistry have been working as well as they could up to the line laid out by Dr. Davis, and, in his opinion, there is no college in the country where a student cannot get a thoroughly good education if he will. The trouble has not been with the colleges so much as with the students. A great many have attended dental colleges without the necessary preparation, but that is a question of the past; the future seems to be quite clear. The student now knows that he has got to face a very strict examination; not only in his own college, but also after he leaves college at the hands of the dental examiners.

He thought too much had been said about the need of education in dentistry. The colleges are improving as fast as they can, and will do their work thoroughly. In practice, however, it must be dentistry first and oral surgery next. Oral surgery is really a specialty of dentistry. There must be specialists for its practice who will be competent to act as surgeons, but the bulk of the profession will always practice dentistry, not oral surgery; but the better grounded he is in the principles of medicine, the better dentist as well as oral surgeon he will be.

Dr. E. A. BOGUE, of New York, said that Dr. Williams had brought to his mind the conditions of the dental profession in Austria. It is necessary there for a man to be a qualified physician before he can practice dentistry, and to become a physician requires seven years, including the academic training. The result is, as may be readily imagined, dentistry has not advanced very far in Austria. In fact, we hardly know to whom to refer our patients who may be traveling in that country, for a good dental operation.

He was a firm believer in the theory of natural selection. Out of two hundred graduates in medicine, not more than fifty would take up surgery, and probably not more than fifty would take up the practice of dentistry. If a man leans toward surgery when he is graduated he will take it up, and the same with dentistry. The old rule, as the twig is bent the tree will incline, will govern the matter powerfully. His own inclination led him to have his son go through the medical course first, and the dental course afterward. He wanted him to acquire the manual dexterity for dental practice, but he did not want him to begin practice till he was well enough grounded in the principles of medicine to recognize disease, even if he did not treat it, and direct such patients where to go for needed treatment; and to recognize disease in his specialty and treat it thoroughly and understandingly, and not to confine himself to the practice of dentistry.

Dentistry had two origins,—one mechanical, the other surgical. We look back to our barber ancestors as surgeons. A large and very reputable class of practitioners have given their entire attention to the mechanical branch, including all operations in the mouth, requiring manipulative ability of a high order, while a smaller class give their attention to surgical diseases of the mouth and associate parts. In Dr. McManus's remark that people want dentistry, presumably he means to refer to operations performed on the natural teeth, in the way of filling, regulating, possibly extracting (he hoped not often). They also want, these people, as he understands it, the ability to understand the cause of disease of the mouth, the power to detect sarcoma, to direct the regulation of the teeth that are irregular, and to know what ground he is treading on when he undertakes the movement of these valuable organs which cannot be replaced if lost.

Just where we will draw the line is uncertain, but this is sure, that preliminary examinations are far and away above what they were twenty or twenty-five years ago, and he hoped they would continue to advance.

Dr. W. H. TODD, Columbus, Ohio, had given the subject of education comparatively little thought. His experience had taught him that medical men who were skilled and worthy men were usually not wanting in courtesy to the dental profession. He found they were willing to receive help from him. It is the poor physician who is afraid he will lose a dollar that is afraid to call on or send for his dental neighbor for consultation or treatment.

Dr. G. LENOX CURTIS, New York, said the question is, How are we going to bring about proper dental education in medical schools, and better dental education in dental schools? These two important questions are the subjects of this meeting. He thought the first part of Dr. Rhein's paper would have a good influence in the medical profession and in the dental profession. It should be brought before the Association of Dental Faculties, and they may possibly consider the division of the course as he outlined it. In this way much could be done toward the union of the two professions.

This paper should be distributed to the medical faculties and prominent medical men, together with resolutions from this section, asking their consideration of the importance of this course. In this way they will be brought to the attention of influential medical men, while if they are published, as they have been, only in dental journals and in the journal of the association, it is doubtful whether many medical men will read them.

There is too much politics in both our dental and medical schools.

The professors seem to have their whole hearts in their work, but are hampered by politics, and their good is dwarfed on account of it.

Dr. RHEIN asked Dr. Curtis what part of his paper did not have a distinct bearing on the subject of dental education.

Dr. CURTIS said that he did not know that he could make the line clear, but where so much was brought in about dental work and dental practice would be confusing to the medical reader and divert him from the main subject of the paper.

Dr. RHEIN feared that Dr. Curtis had listened with one ear slightly closed, or he could not have made such a criticism. He had tried hard to make the paper as condensed as possible, and had received a very flattering letter from the secretary of the section commending it.

In considering the subject it is impossible to divide the preliminary education at any point. The idea, as expressed yesterday and again to-day, that it would be far better for the technical training of the dental specialist, for instance, if he took his dental degree first and his medical degree afterward, shows a lack of appreciation of what proper education should be.

When a man or woman is going to have any part at all in the professional field, it is almost absolutely necessary that the manual training should be commenced in the preliminary educational career, and all the improvements in preliminary educational methods have been in this direction. Taking that position, then, to go to work to give the student an education in the technique of the eye, ear, nose, genito-urinary apparatus, etc., and after he has acquired that picked-up sort of knowledge, to say to him, now study the general practice of medicine, would be like placing the cart before the horse. It would be like teaching a child fractions before teaching him the principles of addition and subtraction. That is the way it looked to him, and he thought to reach a distinct understanding with general medicine, so that our specialty could be placed on the same line as others. The medical man must get his education in general oral knowledge as he gets his education in regard to the eye or to the ear; not to practice it, but to understand it sufficiently to know whether others practice it well or not. There are a large number of medical men, those who have status, who have educated themselves in the diseases and conditions of the mouth, and who therefore show a due appreciation of what is due to dentistry, but they are a minority of the medical profession. The average physician has a fair appreciation of the condition of the organs practiced on by other specialists, but no such appreciation of oral conditions. The part of the paper which Dr. Curtis thought not applicable to the subject was where he showed there were two sides to the question; where he took up the changes that would accrue to the medical profession at large, and that would accrue to the benefit of our specialty. As far as his observation goes, the position of American dentistry to-day appears to be deteriorating as compared to the rest of the world, and it does not compare as favorably as it did fifteen years ago. He believed this is due to the point raised in the paper, to the fact that dental work is not performed by capable men as well as it can be performed, and, to use a very strong expression, that too frequently the confidence of the patient is abused because the dentist finds it more lucrative to serve more patients in a given space of time than it is possible for him to do if he should do his best by those patients that he serves. Now, that was the portion of the paper that he thought Dr. Curtis considered foreign to the cause.

This whole subject is so intertwined and so mixed together that it is impossible to say that what is good for the medical man should not be good for the dental man. What we should consider in a matter of this kind is the benefit of the community at large, and our efforts should be to do what shall be to the benefit of our patients.

He was most anxious that the standard of American dentistry should be kept to the point that it has reached, and it can be kept from deteriorating most surely if the medical man who attends our patients as their physician has such knowledge of dental principles that he can say whether the dentist was prostituting his ability as a professional man or not.

Dr. Henry D. Hatch, New York, did not agree with Dr. Rhein that a physician's education on the conditions of the mouth should be such that he should be able to judge whether the dentist's work was done as it should be, but that he should be educated in the principles of oral surgery and pathology, so that he would know whether to send the patient to a dentist or to treat the case himself for neuralgia. He did not think the physician should feel that it was for him to pass upon the dentist's work. He related the case of a lady who came to him from an adjoining city. She had a gold crown on a central incisor. He removed the crown; not that he expected to find anything wrong with the tooth, but because the crown was so conspicuous. Under the beautifully polished crown he found a broken broach extending into the pulp. Not until he had removed this broach did he learn that the lady had had neuralgia. He gave this instance to illustrate how impossible it would be for a physician to judge the dentist's work. He himself could not have known that anything was wrong till the crown was removed, and certainly a physician could not. In his own personal treatment by physicians he had nothing to complain of whatever. They always treat him on the plane of equality to themselves as a specialist. Whether others are met in the same spirit he did not know, but he had met surgeons most prominent in New York city. He had had one of them administer ether for him while he operated, and then he in turn had administered ether while the surgeon operated. He thought that as a rule the dentist was correctly sized up by the physician, and received the credit that was due him. When they raise themselves and make themselves more competent and more thorough, they will get credit for that.

As to the time when a dentist should get the manual training needed in his practice, it is a hard question to decide. Some think he should get the M.D. degree before studying dentistry. This would bring him to twenty-four years of age usually, and sometimes twenty-seven, before he gets the baccalaureate M.D. and

D.D.S. The man who reaches the age of twenty-four before he studies dentistry will never make a good dentist. It would be better if the training begins before he leaves the high school.

Dr. John S. Marshall, Chicago, said about three or four months ago the secretary of the section had called upon him to talk over the question of dental education, and suggested that we get up a symposium on the subject, as there were two opinions prevalent in relation to it. One is that the dentist should be medically educated, the other that he did not need the medical education. It was thought if we could get expressions from a few of the prominent men in the profession on the subject it might be a great benefit. Dr. Talbot then invited these gentlemen to prepare papers on the subject. He called on Dr. Davis to prepare a paper because he knew his position, which is as follows: If the dentist is a specialist in medicine he should be educated as a medical man. He also spoke of the status of the profession, and of its recognition by this association, and of the arguments which were brought to bear on this association in order to obtain that recognition. He believed this section had done as good work for dentistry as has any dental association in the United States. The character of its papers is as good, and sometimes better, than those presented before the National Dental Association. Besides this, there is no politics here. We come together for purely scientific work, and we labor through the whole session to that end.

He was sorry that Dr. Taft's paper was not here. Dr. Taft had been asked to write on "Preliminary Qualifications," a very important subject. He had touched it lightly in his own paper under the head of "recommendations." He thought that to-day entrance qualifications were too low, and they ought to be raised, and the best way to raise them was to require a medical certificate. As to when the manipulative skill so absolutely essential is to be acquired, he thought that Dr. Bogue and Dr. Hatch lost sight of the fact that fifty per cent. of the work of the medical student is laboratory work, on which his fingers are employed and his eyes are used. He gets as much manipulative training, except in gold working, as he does in the dental school. He is trained from the first in the medical class to use his hands and to use his eyes, and to use them intelligently. He had always held to the view that the only correct way to educate a dentist was to first educate him in medicine, and then in dentistry as his specialty.

In Dr. Peck's paper great stress was laid on object teaching. He spoke of vivisection to show the action of drugs, and its great value in impressing on the mind of the student the action of the heart, lungs, etc. A student who has seen these things never forgets them. It makes a tenfold deeper impression on his mind than reading of it would.

Dr. Brown's paper took up somewhat similar lines, though he tried to show that the two courses of instruction, medical and dental, should go together hand in hand. This idea was carried out in one of our schools in Chicago. The plan was to have the medical and dental students take up the very same course of instruction and the same examinations, the teachers not knowing the medical from the dental students. In the first and second years the dental students had some training in the mechanical laboratory, and the third year was devoted to purely mechanical and operative work. He believed that that school turned out some of the brightest men to be found in the dental profession to-day.

Dr. Steeves laid the same stress on the necessity of a medical education. She has not this education herself, but has been in practice long enough to discover how much better it would be for her if she did have it.

Dr. Hill shows in his paper the interdependence of the dentist and the medical man; that they should work together.

In his own paper he tried to show the fact that to-day in most of the dental colleges they are teaching technique to the exclusion of science, turning out beautiful jewelers, beautiful artisans, but very poor scientific dentists.

He did not desire less time given to manipulative training,—none give too much time to that,—but the students should be more scientifically trained. One young man, a graduate of one of the best scientific colleges of the country, was asked, "What would you do suppose you were called upon to see a child in convulsions from an erupting tooth?" He said, "I would give fifteen grains of chlorate of potassium." Being asked what he expected to accomplish by such a dose, he said he didn't know. Another case: A lady who had been an assistant for seven years in a dentist's office took her little child to a dentist, also a graduate of a first-class institution, to have him examine the central incisor teeth. The child had been ill, and the enamel was unformed on the cutting-edges, and she took the child to find out whether it was better to file these teeth down or allow them to wear down. The dentist said, "It will be only a little while before the enamel will grow over the ends; just see how it is growing now." Both of these young fellows he was personally acquainted with, and they are both fine manipulators. These are facts, and they explain why he puts so much stress on the need of scientific training. He did not say it was the fault of the teaching in the colleges that these men did not know these things. They probably were taught them, but in the examinations there should be some way of finding out whether they were learned or not. It's a disgrace to the profession, and he feels ashamed that any school should turn out such men. In regard to what Dr. Rhein said, we almost always hear when anything is said of individual training of the dentist that medical men are to blame for their condition. "If the gentlemen who applied to the medical college in Baltimore, wishing to establish a dental chair, had their offer accepted, there would never have been any dental schools." Ask yourselves the question, How much science was there in dentistry in 1846? Was it not a handicraft, a purely mechanical calling? What was known of it scientifically at that time? Compared with what we have to-day it was simply nothing. He did not think it was right to blame the medical colleges for this refusal. They acted in the best light they had.

In his paper Dr. Rhein called attention to the fact that the principles of dentistry should be taught in medical schools. This has been done. The first medical school that did it was the Cincinnati School, beginning in 1870 or 1872, and the Syracuse Medical Department was the second, in 1879. Dr. Marshall had the honor of being elected to fill this chair. In Chicago all the medical schools did the same in 1882 or 1883. He had been elected to the chair in the Chicago Medical College. All these schools, with one exception, still maintain these chairs. He did not know whether the medical schools in New York had such schools or not.

Dr. Jas. Truman, Philadelphia, said the question as raised by Dr. Andrews seemed to him to be one of the most important questions that the dental mind can take up at the present day. He continually asked himself the question, "Whither are we drifting? Are we drifting toward medicine, or are we going back to the original standpoint of dentistry?" He believed that the profession was gradually drifting toward the M.D. degree, and that it will not be many years before dentists lay aside the D.D.S. entirely. He was sorry that this was so, for he believed that in proportion as we aspire to build up our curriculum to the point where we can call ourselves M.D.'s just in that proportion will dentistry deteriorate. This view is based upon an experience of a good many years as a dental educator. He had found that in proportion as the standard of education had been raised, just in that proportion have we deteriorated in our dental acquirements. This may not be an agreeable thought to many here, but we cannot resist the logic of facts, and he looked forward to the result of further advancement with dread. Dr. Marshall stated that in proportion as you train a student in medicine you make him a better dentist. He knew that this was not a fact. He had helped to train many medical men in dentistry, but they were almost universally failures as far as dentistry was concerned. It has been well stated that the older a man is the more difficult it is to develop manipulative skill. The work in the medical college does not teach technical ability. A man can only be taught at the bench to make a success in dentistry. He felt very strongly on this point, and was sorry he had not time to elaborate it, but to him it was very clear that if we go on and add every year to our curriculum we will make very poor dentists.

He would like to get the question down to practical details and discuss it in its broadest aspect. In his own school the dental students work right along with the medical students for the first two years, and since this rule has been adopted he thought we have made poorer dentists than they did ten or fifteen years ago. He hoped the section, after further consideration, would see the question in that light, as he was convinced that we are losing ground rapidly by extending the curriculum so largely that the students could not take it all in.

Dr. A. E. Baldwin, Chicago, was glad to have heard Dr. Truman, though he did not agree with his conclusions. He was going to speak of the two professions drifting together, but with a different conclusion. The trend of the two professions seems to be to get closer together. It seems contrary to reason to say that a man will not be a better man because of more extended knowledge, or, in other words, that it will take from my manipulative ability to know of the physiology, pathology, or the histology of the parts of the human frame upon which I work. It seemed to him that the greater his knowledge in these particulars the greater will be his efficiency as a dental adviser to his patients. There are a great many things to be taken into account, but these things are vital.

He finds the dentists are gradually getting over their antipathy toward medical men. They are generally recognizing the fact that we are both on the same ground. As we get over this feeling we will find ourselves becoming wider and better professional men.

Dental education is not primarily manipulative, but our schools should aim to teach, first, what the conditions we find in the mouth mean, and to discover the causes of them and the methods of ameliorating them; besides this, it is important that the student should be placed in a receptive state, so that he can go on with his dental education after he graduates.

He did not want to detract from the importance of the manipulative skill. This he must acquire, but the other is of primary importance.

He would like to know why a medical graduate is a poorer dentist than one who is not a graduate. This statement was made fifteen years ago in connection with a school started in Chicago for the purpose of teaching dentistry to medical men only. One of the teachers in that school made the statement at a dental convention several years afterward that they found the students of that school very hard to get along with. They could not be taught much, as they thought they knew all there was to know. His private opinion was that with a different corps of instructors they would have had a different experience. If the teachers had been fitted to teach them the advanced course, beginning where the medical course had stopped, they would have been successful; but to teach graduates of a medical college a new pathology, a new bacteriology, a new physiology, was of course uphill work.

The best way to get recognition from medical men is to get in line and recognize work done by them, and get our profession in line to advance to the knowledge medical men have. In Dr. Rhein's paper he speaks of the importance of manual and technique training. It seems to be proper that these should be conducted in a co-ordinate department, but in any case we cannot make a good dentist of every student. Some men would be successful as physicians who would never succeed as dentists, and others would succeed as dentists who would fail in medical practice. The selection should be made before the student enters college. In truth, not all dental schools are conducted on a professional basis. Some of them are purely financial institutions with the idea of getting as many students as possible to get money out of them, and as long as we have that kind of schools we will have trouble with the product of the schools.

Dr. W. B. Hill, Milwaukee, said he wanted to plead for the dental education of the medical doctor. They had said he ought to be educated, but he did not know who was going to educate him. He was willing to sit at the feet of any one who would teach him of the mouth. A considerable proportion of the medical profession were looking in vain for some one to teach them. There are those who are competent, but they are not common, and they have not been brought to us. The dentist should be as is the oculist, and physicians would go to him for knowledge as to conditions in the mouth as they do to the oculist as to the eye. We do not go to our fellow-practitioners to learn of the eye, nor do we go to the oculist to learn how to fit spectacles, but we do ask him to teach us of the eye that we may know and recognize disease, that we may note disease in preliminary stages, and refer such cases to the proper one for the work. This is what we ask of dentists as to the oral cavity.

Speaking of censorship over dental work, he said he had been studying dentistry for several years, and to a certain extent had established himself as a censor on dental work. He not only referred patients to the dentist, but he takes them to the dentist and together they determine what is to be done, and together they watch results, and he is happy to say that they generally cure the patient. But in cases where the work is not done in consultation, work that is referred to the dentist, he thought it proper, if the doctor has any dental education, any knowledge of the mouth, that he should see that the work he had ordered was done correctly. He had a few cases in his practice that emphasized this necessity. One of his patients came to him from a dentist. She had had a tooth filled and was suffering intensely. The dentist told her that if he (Dr. Hill) would give her a little morphin to stop the pain for a few hours the tooth would be all right, but he refused to furnish the morphin and sent her back to the dentist. The end of the matter was that the filling was taken out and the tooth properly treated before the trouble was settled. He related this to show that physicians ought to have knowledge to know when patients are properly treated. It is true they might not discern some of the hidden things, but he would be pleased to discern the hidden things that we are capable of if he could be educated on the line of diagnosis. It is no harder for a physician to diagnose from symptoms of the involvement of a tooth-pulp or the presence of a calculus in a tooth-pulp than it is to determine from the same means an inflammation of the appendix. He made the plea that medical men should be educated, and the dental profession should train up a lot of men to be doctors and specialists in the oral cavity to train the medical profession. They need this. It is true that in the medical profession we make slighting remarks of your profession. This is caused primarily by the ignorance of the physician making a remark, and secondly by the poor training of the large numbers in the dental profession.

Hippocrates stated, I believe, that medicine is an art, and there are people who think that if Hippocrates made this statement it is the truth, and has remained truth through all these centuries; but it is not true now, although it was then. Now it is a science. Dentistry is a combined science and art, and these two cannot be divorced, the science being the science of medicine. If we would teach scientific dentistry, it is impossible to divorce the mouth from the rest of the body. It is a part and parcel of it. The same blood that circulates in the mouth and teeth of your patients circulates in their extremities, hearts, livers, and kidneys, and it is necessary, if you be a man to whom we can trust the treatment of the oral cavity, with all its ramifications, with all its nerve supply, with all the possibilities we have for irritation and remote nervous manifestations in the body, then you must understand the whole body; you must make a study of it in its completeness. If, on the other hand, your profession is to be one which has to do only with treating the teeth and filling cavities, then it must take the position of being an art merely, and the work must be under the directing hand of a physician who is competent to judge of the conditions of the mouth as well as the rest of the body.

It has been said that to have a practitioner of dentistry take a complete course in medicine would require so many years of his time that he would be too old to acquire the technique which is necessary in dentistry. His meaning was not that a man should first make of himself a doctor and begin practice, and then change his mind to go back to learn dentistry, but that he should begin to study with the idea of being a dentist in the highest acceptation of the term, with an educational foundation broad enough to reach any height in his chosen profession. The dental training and the medical training can be done at the same time, and there is no reason it should not be. He did not know who was responsible for the divorce of the dental and medical professions, and it does not much matter. The question is, How shall we get together? He believed it could best be done by such a course of study as he suggested. We can work toward it and bring the dental and medical students together. We can educate them in the same classes and make them pass the same examinations, and the two boys who have stood shoulder to shoulder in the lecture-room of the school will have respect for each other in professional life.

He did not believe, with Dr. Truman, that a higher education was a menace to the profession of dentistry. A dentist is a scientific man who has not only his head trained, but also his heart and his hand; and if this is true, he cannot be too highly educated. He cannot have a culture too great to enter this profession. His ideal dentist stands head and shoulders above the practitioner of medicine. A man who knows all the medical man knows, and he has this special knowledge besides.

He suggested that we set up the high ideal of the specialist in medicine, and, secondly, take in for education the very best talent that we can get: a scientific mind, a cultured gentleman, and a deft hand being the requirements, and that we carry on this education of the physician and the dentist if possible in one institution; carry them on side by side, giving them both the same foundation, and allowing the dentist to add to this the practical work in the laboratory, in the infirmary, in the hospital, and in the clinic room, until he stands a specialist who is competent to consult with any physician, and thoroughly capable to carry out the desires of the physicians in the treatment of their patients.

Dr. Wilbur F. Litch, Philadelphia, said that he could confirm from his own experience the statement made by Dr. Truman, that a physician entering a dental school usually made a very poor dentist, but he did not accept the conclusions which Dr. Truman drew from this fact. In the selection of a vocation or of a specialty we follow the line of least resistance, and, as a rule, that is the line of personal aptitude; so that the man who, after passing through his schoolboy days, determines to be a physician is probably not very highly endowed with mechanical skill. The same may be said of the man who resolves to devote his life to commerce or other non-mechanical callings. Hence he did not think that the physician is more likely to make a poor operator than the man who comes from trade, the pulpit, or the bar. The physician makes a poor operator because he has not been trained from his youth in manipulating processes; not because he has studied medicine. He fully agreed with Dr. Bogue that the highest skill in technique, that perfect adjustment of co-ordinant muscular movement which constitutes knack, is attained only where the training is begun early in life. This is well illustrated in piano-playing, perhaps the most difficult technique the human organism has been forced to master.

Dentistry is peculiar in the fact that it requires such a high degree of complex technical skill, conjoined with a good degree of scientific knowledge, and the problem is how to arrange our courses of instruction so as to secure these combined results. If we start with medical instruction without any preliminary training in dental technique, there will be that loss of skill which is the result of insufficiency of training in early life. It is, however, possible to arrange the courses of study so that this objection can be in a great measure overcome. Possibly most of those present have seen the paper of Professor Bowditch, read in Washington before the Medical Association, entitled "The Medical School of the Future," in which he outlined the difficulties of the situation as regards the overcrowding, the overrating of medical courses, and stated that as the probable outcome of the present situation courses elective in their character would be established. This experiment will probably be tried first in Harvard College. This will give us an opportunity to judge of such a system as applied to stomatology, for he, Dr. Litch, did not doubt that in these medical universities, as they will be called, stomatology will be one of the specialties taught. It is to be hoped that the experiment will be tried and will be successful; not only because it will give us a better class of men in dentistry, but because it will be a stimulus to existing dental schools, which will be compelled to advance their courses fully up to the standard of elective course system or sink to an acknowledged subordinate place, and perhaps cease to exist. Allusions have been made to the ideal instructor as the one who endeavors to teach general principles, as well as concrete facts. His observation is that the general instructor of to-day is the one who thoroughly drills men to pass examinations by hammering facts into them, and that it is the quizmaster, and not the professor, who commands the largest following and most earnest attention.

One great trouble that we have had, and still have, in advancing the course of instruction is the indifference of the student to scientific knowledge. Too many of them come to us with the idea that dentistry is simply a money-making trade, their highest aspiration being to learn to put in well-finished gold fillings. To such men dental science is superfluous and useless. He finds that the most effectual stimulus to better scientific attainment on the part of students is the fact that, in addition to the faculty examination, they are compelled to go before state boards. This, at the same time, has forced upon the colleges more strict requirements, and thus has accomplished a double good.

Dr. R. R. ANDREWS, Cambridge, Mass., has said that the elective system of the universities was just what was needed. As the university makes every man take certain studies to get his degree of A.M. or A.B., and then other studies in elective courses if he wants special degrees, so let the medical university compel them to take the medical course to get the M.D. degree and special courses for dentistry and other specialties. He thought there was so much manipulative work in the study of general medicine that he could not conceive how a man could lose manipulative power by going through the medical course. If he has the intention from the first that he will take up dentistry, his attention will be fixed upon dental work, and his opportunities for it will be sufficient.

Dr. E. A. BOGUE, New York, hoped that Dr. Litch would use all the persuasive powers of either tongue or pen that he possessed to persuade the examining boards of the future to so examine the students turned out from our colleges as to determine not only what they know, but what they can do, and let their decision be based on the latter as much as on the former. Too often it appears as if the examination was simply to learn how many facts had been crowded into the student's head; not whether he could make any use of the fact. He quoted from Dr. Kimball at a meeting held last night. Dr. Kimball had said that the dentist owed a great debt to the community; not only the professional community, but the people at large among whom he practiced; also to his assistants, who Dr. Kimball called his associates, and he carefully went into the *modus operandi* of choosing and training those assistants so as to first be assured it is a worthy man who is to succeed you in serving the public, and to see that, as far as your effort will go, he shall be thoroughly equipped for the service. His old preceptor used to say that M.D. meant a miserable dentist. Dr. Varney, because he was a good dentist, became a good military surgeon.

Dr. ALICE STEEVES, Chicago, Ill., said during her early experience she had spent three years in hospital life, and the skill she had got there in manipulating instruments had been of much benefit to her in dentistry. She thought a medical education would be invaluable to her as a dentist.

Dr. G. Lenox Curtis, New York, said we work all around the subject, "How to make dental students." His idea was first a good general education, then the medical education; then select those who have mechanical aptitude to study dentistry. Mechanical and literary ability do not go hand in hand as a rule, but we do find men with marked mechanical aptitude among medical men. The classical man makes the best physician; the mechanical man the best surgeon, and dentistry is surgery. Dr. Rhein says dentistry in America is deteriorating. That this seems so is because of the advance of dentistry in other countries, so our great knowledge does not seem so supreme as it did a few years ago. European dentists are being educated, and they have good dental colleges now. So American dentists and American dental institutions do not stand out so clear against the horizon as they did fifteen years ago.

Dr. M. L. Rhein, New York, wished to say that Dr. Hill's words were just what he would like to have said on the subject. He recognized his own inability to express his sentiments as well as Dr. Hill had.

Some seemed to have thought from his remarks that he felt that members from this section had received slights in their connection with medical men, but he had not meant this. In his own case he had had no such experience. He was merely trying to draw the distinction which Dr. Hill had made so explicit, and which he had not been able to make as plain as Dr. Hill did.

Dr. Marshall spoke of the establishment of dental chairs in medical schools in Chicago. He in his paper had noted the advance of the schools in the West over those in the East, and limited his remarks to the conditions in the East. In this respect we must recognize the superior advancement of the West. He had no knowledge at the present time, after a great deal of inquiry, of any such education being given to medical undergraduates in Eastern medical institutions, and he specially limited his remarks in that respect to the East. The necessity of such a paper as his was made so much more marked by Dr. Marshall showing that this ground is covered in the city of Chicago, and is not covered in our Eastern medical colleges.

Dr. E. S. Talbot, Chicago, said he had been a disciple of Dr. Davis for the last thirty years, and had been looking forward all these years to the advancement of dentistry and the gradual coming together of the medical and dental professions, which cannot be avoided. They are bound to come together. The reason they are bound to come together is that we have more knowledge in regard to the practice of dentistry and the practice of general medicine. Spencer says there is evolution in everything, and there is evolution in dentistry. And those colleges and those teachers who do not keep pace with this evolution must take a back seat. The dental colleges will have to follow. They will have to take a step in advance and lead the issue. That is a law of evolution that cannot be overlooked. In this discussion, as always, the manipulative part of dentistry comes to the front. Is it possible that dentistry is based entirely upon plugging teeth? Dr. Truman seemed to think that manipulative skill was the only important factor in dental practice. Do not diseases of the gums and alveolar process constitute an important branch of dentistry? They are more prevalent than decay of the teeth, and more to be dreaded. These diseases of the gums and alveolar process follow every disease of the human body, and are produced by changes in modes of living and changes in climate, as noticed in our soldiers in Cuba and the Philippines, and as noticed in men working twenty-six hundred feet above the level of the sea. Now, if this is true, the dentist must know all the diseases in the human system to practice successfully, and to know that he must have a medical education. It is true that dental colleges, according to the time at their disposal, do teach these branches, but that time is not sufficient. Dr. Taft had informed him that the University of Michigan has increased the course of study to four years of nine months each, with an entrance qualification of a high school education. When all the colleges become able to not only give their students mechanical skill and manipulative ability, but also the necessary foundation knowedge of anatomy, pathology, chemistry, physiology, etc., the students will be thoroughly fitted to practice their specialty.

Dr. A. E. BALDWIN, Chicago, introduced the following resolution, seconded by Dr. Curtis:

"WHEREAS, It seems evident from the papers presented to our section, and especially by the able paper of Dr. M. S. Davis, that there should be a closer union between the medical profession and our specialty, and

"WHEREAS, To bring this union closer it seems advisable that there should be established in all our medical colleges chairs on Stomatology; therefore be it

"*Resolved,* That we elect a committee of seven, consisting of the chairman, secretary, and Executive Committee of this section, with two others (of which committee our chairman and secretary shall be chairman and secretary respectively), to use all legitimate efforts to bring about the above results, and to work for the co-education of all students in the foundation principles of medical education."

NATIONAL DENTAL ASSOCIATION.

(Continued from page 914.)

SECOND DAY—*Morning Session.*

THE association met at 10 o'clock A.M.; President B. Holly Smith in the chair.

The chair announced the following as the committee to consider the expediency of teaching the care of the teeth in the public schools: Drs. Richard Grady, Baltimore; H. H. Johnson, Macon, Ga.; W. E. Walker, Pass Christian, Miss.; I. P. Wilson, Burlington, Iowa; C. N. Johnson, Chicago.

The Executive Council reported, recommending increasing the membership of the Committee on History from three to five. Later

Drs. J. Taft, Cincinnati, and H. B. Noble, Washington, were appointed the additional members.

Dr. J. D. PATTERSON, from the Credentials Committee, reported that the committee had inquired into the charges of unprofessional conduct brought against Dr. R. Ottolengui, New York, with reference to an alleged interview in one of the daily papers. The committee had had Dr. Ottolengui before it, and Dr. Patterson asked that Dr. Ottolengui be allowed to make the same explanation before the association which he had given the committee.

After Dr. Ottolengui had made the explanation, he was exonerated from all blame in connection with the matter.

The report of the committee on the president's address was read by Dr. C. N. JOHNSON, Vice-President Hart in the chair.

Dr. E. K. WEDELSTAEDT, St. Paul, Minn., read a paper entitled "A Method of Preparing Distal Cavities in Cuspids."*

Dr. C. N. JOHNSON, Chicago, in opening the discussion, thanked the essayist for the clear and systematic way in which he had presented his subject. The idea of the method proposed is to simplify these cavities,—not their excavation, but the filling of them. Some may think that this method does not look in the direction of simplifying. As to this, he had to say that he did not believe that Dr. Wedelstaedt would follow this plan in all distal cavities in cuspids, but only in those difficult cases where failure would be likely under other procedures; in that view and in such cases it does simplify the operation. When Dr. Wedelstaedt first asked him to open the discussion on the paper he asked that he (Dr. Johnson) fill some such cavities by this method before coming here. He had therefore looked for suitable cases as his patients presented, but he had seen none. The idea put forth is one of discrimination. Some may fear that there will be too much show of gold in a filling of this character, but if they will study the matter they will find that this is not so. Personally, he managed these cases in a different manner. We more often find the cuspids breaking down toward the lingual than the labial surface. With that kind of a case he would not cut away the labial surface for the purpose of making a step anchorage. He would cut away from the lingual surface mostly, and only so much of the labial as was necessary to let the cavity be got at. He could then introduce the filling with hand pressure, holding the mirror on the lingual side of the tooth and using a right-angle plugger, with a good handle, firmly grasped in the palm of the hand. He wanted to commend this as one of the best of many methods to facilitate these operations.

Dr. THOMAS FILLEBROWN, Boston, wanted, for one thing, to emphasize the commendation of Dr. Johnson as to the superiority of hand filling. As to filling distal cavities in the cuspids, Dr. Robert Arthur many years ago published and illustrated the method described by Dr. Johnson as applicable to all the anterior teeth. Dr. Fillebrown believes that more teeth are saved by hand-pressure fillings than by those put in with the mallet. When we want a hard filling, as on a masticating surface, of course the mallet is better; but for adapting the foil to the walls of the cavity hand pressure is better than malleting.

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*Printed in full at page 993, current issue.

Dr. THOMAS E. WEEKS, Minneapolis, wished to direct the attention of the members to the exhibit of methods of cavity preparation in the clinic room. The object in presenting the matter in this way is to have the subject of cavity preparation discussed, and the principles which should govern it settled if possible. There can be no doubt that principles of form for cavities of different classes do exist, which must be faithfully carried out in order to have the most durable fillings. He hoped that these underlying principles would be discovered.

Dr. WEDELSTAEDT, in closing, said that if we attempted to discuss *in extenso* the principles underlying the preparation of cavities, there was no telling where the discussion would end, and perhaps, in that view, the less said the better. He returned his thanks for the reception accorded his paper.

Section III was passed, as was also Section IV, temporarily.

Section V, Anatomy, Pathology, and Surgery, was called, and Dr. W. C. BARRETT, Buffalo, chairman, read the report, as follows:

Section V embraces so many fields of interest that it is somewhat difficult to select single points for presentation in its annual report. And yet to throw the whole broad domain of normal and morbid anatomy open for consideration, when the time is limited at the most to a very few hours, is but to invite a desultory, superficial, profitless discussion. The chairman of the section has, therefore, in the interests of the association, assumed an authority which might perhaps be successfully questioned, and has selected certain definite points for elaboration; and that there may be some certainty of a proper presentation, he has named the essayists who are charged with the duty and not left the matter dependent upon chance. The section is, therefore, reasonably certain to advance something of permanent interest.

It desires to offer the following as the regular program, volunteer papers to be presented only after these shall have been considered, unless the association, by vote, shall order otherwise:

Anatomy.—"The Sources of Nutrition of the Dental Pulp," paper by A. O. Hunt; "The Evolution of the Complex Molar from the Simple Cone," paper by A. H. Thompson.

Surgery.—"The Surgical Treatment of Fractures of the Maxillæ," paper by J. S. Marshall; "Antiseptic Surgery of the Face and Mouth," paper by W. H. G. Logan.

Pathology.—"The Oral Manifestations of Syphilitic Infection," paper, with lantern illustration, by W. C. Barrett.

The chairman desires to present one single point in addition. The subject of inflammation lies at the bottom of all pathologic action, for it is to the nutritional changes involved in that comprehensive process that tissue and functional modifications are chiefly due. Under the old method of study of that which has been denominated "inflammation" there was much of complication and little of true comprehension. According to the nomenclature of the early pathologists, there were as many different kinds of inflammation as there were functional modifications produced by it. Each degenerative change was considered as a distinctive disease, with its own special nomenclature and method of treatment.

Accordingly, we find laid down in the older text-books acute, chronic, catarrhal, interstitial, parenchymatous, specific, and plastic inflammation, with all those terminating in "itis," as osteitis, myelitis, gastritis, pharyngitis, pneumonitis, carditis, pulpitis, periostitis, and many more, each to be studied as a separate affection from an individual standpoint. That product of certain degenerative changes which is called "pus" also had its separate pathology, and accordingly there was laudable, ichorous, sanious, serous, catarrhal, mucoid, and other kinds. A more modern conception of the changes which result in suppuration now considers these definitions as descriptive only of accidental or secondarily degenerative forms in suppuration. It is not intended to assert that these terms have become entirely obsolete, but they no longer convey the same meaning that was formerly attached to them. Instead of being descriptive of definite changes, they simply designate certain phases assumed during the same process, or they may particularize the same general modification in specific tissues or organs.

Formerly that which is now included in the term "hyperemia" was considered a part of the inflammatory change. The modifications in vaso-motor function, which are the consequence of irritation, were classified as the initial steps in the inflammatory process, and hence the latter might be viewed as either progressive or retrogressive, according to its termination. Indeed, some modern pathologists, while recognizing and accepting the later conclusions, yet for convenience' sake speak of hyperemia as, at the very least, leading up to that which is more properly distinguished as inflammation.

The better comprehension of the influences of the fungi which has been brought about by the investigations of modern bacteriologists has completely modified many of our ideas of the morbid processes. Many changes, once supposed to be idiopathic, are now known to be deuteropathic. The list of diseases now known to be zymotic in their origin includes the majority of those most fatal to mankind. The deadliest degenerations are those due to the presence of specific organisms. The intensity of the vegetable and mineral poisons produced in the due processes of nature bears no comparison to the virulence of the toxins that are the result of infection. The lethal dose to some of the smaller animals of the alkaloid strychnia is about one-tenth of a grain, while the septic product of the bacillus of tetanus produces as deadly effects when one-ten-millionth of a grain is used.

The researches of the past few years have modified the views of pathologists concerning that process called inflammation. It now belongs in the domain of bacteriological pathology. There is but one general form of inflammation, and it is the result of septic infection. It is necessarily degenerative in its nature, and begins with the destructive process. All of that which comprises the early nutritive changes, which has to do with the modifications in the blood-supply and is dependent upon vaso-motor influence, now is classed as hyperemia, inflammation having its inception in septic inoculation. There is no inflammation until infection, and with an aseptic condition inflammation as a degenerative process ceases.

This materially simplifies our ideas of pathology, and ascribes to zymogenic influence that which was formerly supposed in many cases to be strictly idiopathic. But it gives to hyperemia an added significance and opens another rich field to research. For dentists it puts that which has been, and still is, denominated "pulpitis" and "pericementitis" in another light, and enables us to comprehend certain changes which to the dental pathologist of a few decades ago were a sealed book.

Dr. Barrett read a paper by Dr. A. H. THOMPSON, of Topeka, Kansas, entitled "The Evolution of the Complex Molar from the Simple Cone."*

In opening the discussion, Dr. Barrett acknowledged that he could not agree with the American paleontologists nor with the author of the paper, for he does not believe that all the changes which have occurred in the teeth were the evolution of new forms. In the shark, for instance, we have the single conodont form, and sometimes there are secondary tubercles from the base. Was this a budding, or was it a coalescence of two or more denticles? If we study the teeth of the elephant and of the mastodons, we can't escape the conviction that their teeth were the result of a coalescence of separate cones. If you open their jaws you will find that their teeth are formed of separate plates, every one of them, and melted or fused together. If you cut across the cuspid of man you find a ring of enamel inclosing the dentin or body of the tooth, but down on the root you find the dentin surrounded by cement. If you fuse them you have the exact type of the tooth of the mastodon. In the herbivora we find cement all over through the teeth. If we take as types that development of the bunodont forms, the fusing of separate denticles is surely a much more reasonable explanation of their origin than Cope's theory. Another thing which tends to strengthen this position is the fact that in the teeth of the herbivora, especially of the elephants, there is a separate root for each tubercle. Were these roots evolved the same as the cusps? He could think of no other tenable explanation for these teeth but the melting together of separate forms. Such a paper as this demands our candid consideration. He hoped the time was not far distant when the class of members who would take up these questions would be large. There is no science in filling a tooth or in making an artificial denture or a velum. We will be a scientific profession when the men who practice dentistry shall generally take up these questions from the mere love of the study.

Dr. J. D. PATTERSON, Kansas City, from his understanding of the reading of the paper, thought that Dr. Thompson was right and Dr. Barrett wrong.

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*Printed in full at page 998, current issue.

He wanted to interpose an objection to Dr. Barrett's description of the origin of inflammation. Dr. Barrett calls every degenerative change that precedes the breaking down of the tissue hyperemia. Unless some better reason can be given than has been stated, he could not see why we should change the statement as we have had it for years. We have, before the bacteria present, a traumatic injury, redness, heat, pain,—say swelling too. What is the use of the distinction that we have no inflammation until we get the breaking down of the tissue? The old way of distinguishing the various stages was quite good enough.

Dr. G. H. CLAUDE, Annapolis, Md. Hyperemia in the new nomenclature takes the place of the old congestion.

Drs. PATTERSON and BARRETT. They are quite different. Congestion is a different thing from hyperemia.

Dr. BARRETT. Hyperemia is simply a change in nutrition. Sometimes there is an increased, sometimes a decreased, flow of blood. No rule can be laid down as to how a given injury shall affect the arteries and capillaries.

Dr. CLAUDE. Hyperemia means simply a plethora of blood. Congestion means the same thing.

The subject was passed.

Dr. W. H. G. LOGAN, Chicago, read a paper, entitled "Antiseptic Surgery of the Mouth and Face."*

Dr. M. L. RHEIN, New York, thought the subject as brought before the association very timely. The experiments which the author of the paper had carried out in the short time at his disposal had shown so much that it leaves before us a very vivid picture of what ought to have been accomplished long ago. Operative dentistry cannot afford to brush aside the facts presented here. The technique of the handling of cases after operation is of the greatest importance, but we have not previously had brought out so prominently the fact that there is very great difficulty in the treatment of wounds in the mouth. This difficulty is well known to us. We know how much longer it takes wounds in the mouth to heal than those on the body. The general surgeon knows this difference, and he dreads it; and he would not be surprised if many of the operations on the upper and lower jaws performed by general surgeons are done externally because of that dread.

The point raised by Dr. Logan, that oral bacteria cannot live in an acid-producing medium, is worthy of study, and he (Dr. Rhein) could not see why such a study should not bring out practical results of great value to us in our practice. The only danger which he could see as likely to occur in following out the line suggested by Dr. Logan would be the possibility of changing the entire oral fluids to acid, and the possibility of the effect of this changed secretion on the enamel of the teeth. It is well known that a fluid which is slightly acid has a greater effect on tooth-structure than a strong acid. Of course, these measures can be carried out without permitting the entire oral fluids to be made acid. He only raised the point as a precaution. It had become apparent to him while listening to the paper that we have been lax in not devoting more of our ingenuity to the healing of wounds in the mouth. He believed that this paper would lead to good by awakening dentists to the need of better work, and would bring about results which will place us in a better position as to the treatment of such wounds.

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*Printed in full at page 989, current issue.

Dr. CLAUDE approved of the work which had been done by Dr. Logan, but he did not believe there was any better antiseptic than normal saliva. If a man cuts his finger the first impulse is to put it in his mouth, and there is no infection of the wound if he is healthy. If a dog gets a splinter in his foot, his first act is to coat it with saliva. He thought the experiments described were along the right line, but if there is infection you have got to go to constitutional treatment for a cure. The conditions in a mouth that is healthy are favorable to the best results. If particles of food are left to ferment, they keep the mouth in an acid condition. Pus itself is acid, and it would seem that acid treatment of wounds is not correct, except as the acid neutralizes the other acid of the pus, and this can as well be done by an alkaline agent.

Dr. JAMES TRUMAN, Philadelphia. Saliva is never an antiseptic. How can it be? Food allowed to remain in the interstices between the teeth is liable to ferment always. Therefore we can't depend on the saliva for antiseptic effects in the treatment of wounds. He had been more than pleased that one of our own men had been able to work this question up as far as he has. It is just this line of investigation that this association is bound to work out. It is time to go on with it. He could not agree with Dr. Logan's statement that the saliva is alkaline. He had been testing saliva a good many years, and he had never found it decidedly alkaline; it is almost always neutral. As to the action of acids under the circumstances described in the paper, he was somewhat in doubt. Some operators who have tried lactic acid in the treatment of wounds have produced violent inflammation. The broader question of antisepsis is one of the most important for us to deal with. When a wound in the mouth was allowed to go on by itself under the idea that saliva is an antiseptic, he had seen syphilis carried. He had seen necrosis of the jaw from the simple extraction of a tooth when antiseptic precautions were neglected. No one is more careless with his instruments than many dentists are. You recollect Dr. Hugenschmidt's description of his experiments to carry out and demonstrate Metchnikoff's idea of phagocytic action. If this paper under discussion was properly understood, what dentist would extract a tooth without antiseptic precautions? We cannot go as far as the surgeons in the direction of securing antisepsis, but we ought to go as far as we can; not only to save our patients, but ourselves. It is our duty to carry out antiseptic precautions thoroughly.

Dr. TRUMAN W. BROPHY, Chicago. It was long ago recognized by physicians and surgeons that the mouth, including the nasal area, was the center whence infection was distributed to the body. It behooves us to see to it before operating that the oral cavity is clean, and made as thoroughly aseptic as possible. The paper by Dr. Logan has drawn attention to important matters. Some years ago considerable was written on the prophylaxis of the teeth, and numerous washes were proposed for the purpose, many of them alkaline in reaction. It is a mistake to attempt to correct the oral fluids by alkaline washes. We know that certain bacteria generate lactic acid, and that lactic acid destroys the teeth. If it is true that bacteria develop only in an alkaline medium, then we are simply adding more alkaline matter to assist in their development. Why not make use instead of an acid wash of sufficient strength to destroy the bacteria? Right here is an important matter for us to get down to. In the care of wounds in the mouth Dr. Brophy never regarded the saliva in the light of an antiseptic, but, on the contrary, as the very opposite. We find infection frequently takes place in wounds to which the saliva has free access. To prevent this we must destroy the agents of infection. It is our duty not only to cleanse the wound, but, if possible, to seal it up so that the saliva cannot enter. We find difficulty in this because the action of the mucus will loosen anything we can use for sealing purposes, and the wound is again open to infection. He would suggest to gentlemen engaged in bacteriological studies that they take up the use of alkaline washes in the mouth and see if it is rational, and whether, as he thinks, it would not be better to use a mild acid.

(President Smith here resumed the chair.)

Dr. G. V. I. Brown, Milwaukee, Wis., had paid considerable attention to this subject the past two years, and he was convinced that the data on which we depend with reference to these washes were unreliable. Here is an experiment which is easily verified. The mouth was rinsed with distilled water, and the saliva gave cultures of bacteria. Then the same mouth was rinsed with a 1-2000 bichlorid of mercury solution, kept two minutes in the mouth. This gave no growths. Immediately afterward it was rinsed with a three per cent. solution of carbolic acid; no growth. Then with a three per cent. solution of hydrogen dioxid, and the cultures showed. In many instances there was a free growth of bacteria. After the use of the hydrogen dioxid, any of the other agents seemed to be free from infection. The mucous coating of the membrane resists the action of some agents, and consequently some bacteria which were in the mouth were covered up and the germicides were kept from contact with them. This covering was washed away by the hydrogen dioxid, and the bacteria came with it. These facts would seem to suggest that we must have something to cleanse mechanically before the germicide is applied. Dr. Logan has given us a new pathway to travel along. The conditions of the test tube are not the same as in the mouth. He hoped the ideas suggested in the paper will be followed out. The mouth is open to the air. The suggestion as to permanent dressing is excellent where it is feasible, but many operations cannot be done in that way. He would suggest the use of chloro-percha in saturating dressings. Some years ago in an abdominal operation he had had to use chloro-percha to keep the dressings *in situ*. He had used it in the mouth by covering with satin gauze and smoothing down. It will do very well where there is no motion.

Dr. J. Y. Crawford, Nashville, Tenn., thought the paper well written, with many good things in it. He could not say that he objected to anything in it, because he does not know about it. There ought to be in every college a man who teaches minor surgery. This paper treats of minor surgery. One remedy referred to in it was alcohol. Nobody has yet appreciated the value of alcohol in minor surgery. Some time since he found on a train a man from Chicago with an infected wound. Could find nothing on the train in the way of a remedy but alcohol. It was applied, and relieved him. The author of the paper insisted on the use of dry dressings; the speaker believed in the wet dressing, and it should be of alcohol. He had believed there was a potency in the fluids of the mouth to accomplish to a degree antisepsis. He thought it was a correct conception that when we make a local application the same principles underlie the cure as in constitutional treatment.

Dr. G. W. Cook, Chicago. On one point Dr. Logan appears to have been misunderstood, in that he is stated to advocate alkalinity of the mouth. It matters not what the condition is when the dressings advocated by Dr. Logan are applied, it very soon becomes acid. The principles of the protean compounds are not yet understood, and these compounds influence the growth of bacteria. Put a patient for a few days on iodid of potassium or mercury, and you will find morphologically a great change. Dr. Logan's paper is valuable. It goes to the laboratory, where we have to go for all our knowledge. The only way we can determine any scientific knowledge is by going to the laboratory and following it out on scientific lines. We can put alcohol on the skin and make an incision, and we will find union taking place a little better than if we had used sterilized water. It cleanses better, but we can't use alcohol in the mouth. As to wounds in the mouths of dogs, the saliva of men differs largely from that of dogs, and the saliva of different persons is very dissimilar in its character and its action. Take saliva from the mouth of a robust, healthy man, it is non-pathogenic; that from a tuberculous person is virulent in its effect. As to sterilizing the mouth with carbolic acid and bichlorid of mercury, when we recall Koch's experience that it took forty days to kill the anthrax bacillus with a five per cent. solution of carbolic acid, we see that it is not well to use that. Bichlorid of mercury is important. Many substances used as antiseptics are called antiseptic because they act on certain forms of microbes, but if you apply the same to the lower forms of vegetable life they have no effect. Bichlorid of mercury seems to have a greater affinity for the vegetable bacteria than for the higher forms, as the leucocytes. The many substances constantly being brought out ought to give us whatever we shall need in the way of germicides.

Dr. T. B. Hartsell, Minneapolis, wished to thank Dr. Logan for the able way in which he has presented a subject of great interest to the dental profession; of greater interest, perhaps, than many others, because it has been neglected in the past. He also wished to thank Dr. Barrett for bringing out prominently the fact that inflammation is the foundation stone upon which all pathological research must be based, but he would go a step in advance of Dr. Barrett and say that we can have as typical an inflammation from a traumatic injury as we can from infection by pathogenic bacteria.

The essential feature in every inflammation is the immigration of leucocytes to the point of injury, and repair of the part through the influence of the leucocytes and the fixed cells of the part. In striving for a surgical dressing of any sort we must recognize the recent discoveries of Dr. Adami, of Montreal, who has shown us that there are two classes of leucocytes that perform the work of protecting the body and aid in the upbuilding of new tissue. One is the phagocyte, which absorbs and assimilates bacteria, thereby destroying them; the other a leucocyte which produces an antitoxin capable of destroying the bacteria *in situ.* In the light of the facts that have been so ably set before us by Dr. Adami, this ionic compound of which Dr. Cook spoke is merely the product of that leucocyte capable of furnishing this inhibitive fluid which checks the growth of and even destroys bacteria as it comes in contact with them.

There is a positive chemical influence of the bacterial ptomaines to attract leucocytes to the site of the injury, which we call "chemiotaxis." Certain drugs have this same chemiotactic power. In the past they have been known as alteratives. He would define an alterative as a drug which has the power of attracting leucocytes to a diseased or inflamed part. This has been empirically recognized in medicine for many years. Iodin and other drugs of the same class benefit certain inflamed conditions, because they stimulate the approach to the diseased area of leucocytes capable of grappling with and inhibiting or checking inflammation or disease.

The discovery of antitoxin for the treatment of diphtheria is another application of the knowledge that we now have of the power of this leucocyte to combat disease, and a glance at the manner in which antitoxin is procured will illustrate this principle. Take a good strong culture of Klebs-Loeffler bacilli; percolate the ptomaine from the culture with alcohol; filter the bacteria from the percolate; inject into the blood of a healthy horse a dose short of the lethal dose. This neutralizing material that we know in observing its activity near or in the site of an infected area, discharges its contents and neutralizes the poison that has been injected. Repeat this injection for a series of months, until you are able, perhaps, to inject eight hundred times as much of this poisonous ptomaine at the end of the series as at the first dose. What have you done? You have slowly increased the number of leucocytes and their power of resistance to such a point that this animal's blood is vastly rich in this material capable of inhibiting the growth of the Klebs-Loeffler bacilli. Bleed the animal; allow the clot to settle, and the serum thus obtained is so powerfully enriched with this unknown substance capable of checking the growth of diphtheritic bacteria that a small injection of it thrown into the blood of one suffering from diphtheria usually will cause the inhibition of the diphtheritic germs so quickly that the temperature drops from the maximum to normal, or nearly normal, in from ten to twelve hours. What has been done? It would be too slow a process to expect to increase the leucocytes in the blood of a patient suffering from this disease rapidly enough to grapple with the diphtheritic germ directly, so we have taken advantage of this process to immunize the blood of the horse, and to so enrich it in this antitoxin compound that a very small dose of the serum taken from such blood is capable of checking the growth and development of the bacteria. Something of the same idea was recognized by Dr. Koch in his efforts to discover something that would inhibit the growth and development of the tubercle bacilli, and it seems to me that failure in his work was partially due at least to the fact that he placed the ptomaine obtained from tubercular cultures directly in the blood and expected the production of leucocytes to be formed fast enough and in great enough power to inhibit the growth of the tubercle bacilli there present, and failed because the body is unable to respond rapidly enough with the antitoxin to overcome bacteria.

In striving for a surgical dressing of any sort whatsoever, a recognition of the vast importance of the cause and process of inflammation, especially the manner in which repair takes place and the wonderful work of the leucocytes, should be recognized. And in striving for a drug or drugs to inhibit the growth of bacteria in an open wound, we should endeavor to use such drugs as will aid and not retard the action of the leucocytes.

Dr. V. H. Jackson, New York, had been using carbolic acid for years as a dressing for wounds, with gratifying results. A great medical man is now teaching that you can save trouble in hip-joint operations by the use of carbolic acids. Alcohol is an antidote for carbolic acid. He had used alcohol in the form of tincture of myrrh for years, but it was the alcohol which did the work.

Dr. Claude did not wish to be misunderstood. It might be inferred that he did not use antisepsis with his instruments, which is not true. The point he wished to make was that the paper ignored the presence of the saliva as an agent in the cure. He had used tincture of myrrh, eight parts to water one part, as a dressing. Perhaps it was the alcohol in the tincture which was responsible for the good results. Dr. Welch, of the Johns Hopkins Hospital, had a patient from whom he could get a culture of the diphtheria bacillus at any time.

Dr. Logan, in closing the discussion, said that he should follow up the experiments.

Adjourned to 7.30 P.M.

(To be continued.)

AMERICAN DENTAL SOCIETY OF EUROPE.

At the twenty-seventh annual meeting of the American Dental Society of Europe, held in Paris, August 7, 1900, the following officers were elected for the ensuing year: Dr. W. Mitchell, London, president; Dr. S. S. Macfarlane, Frankfort-on-Main, vice-president; Dr. L. J. Mitchell, London, hon. treasurer; Dr. W. E. Royce, Tunbridge Wells, hon. secretary. Executive Committee, Drs. L. J. Mitchell, E. Lawley-York, J. H. Spaulding, L. C. Bryan, W. S. Davenport, W. L. Croll, W. Mitchell, *ex-officio* (chairman), W. E. Royce, *ex-officio* (hon. sec.). Membership Committee, Drs. C. J. Monk, G. Cunningham, W. L. Croll, S. S. Macfarlane, *ex-officio* (chairman), W. E. Royce, *ex-officio* (hon. sec.).

Waldo E. Royce, *Hon. Sec.*,
2, Lonsdale Gardens, Tunbridge Wells, England.

DENTAL SOCIETY ANNOUNCEMENTS.

UNION MEETING OF THE SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

The thirty-second annual union meeting of the Seventh and Eighth District Societies will be held in Buffalo, Tuesday, Wednesday, and Thursday, October 30, 31, and November 1, 1900. These two districts comprise sixteen counties, and the attendance should be large. A most interesting program is being arranged by the Business Committee, with clinics and demonstrations as a special feature.

S. E. MacDougall, *Secretary.*

DENTAL COMMISSIONERS OF CONNECTICUT.

The Dental Commissioners of Connecticut will meet at the capitol in Hartford, Tuesday, Wednesday, and Thursday, November 13, 14, and 15, 1900, to examine candidates for license and attend to any business proper to come before them.

The written theoretic examination Tuesday and Wednesday, November 13 and 14. Practical examination in operative and prosthetic dentistry at 9 o'clock Thursday, November 15.

All persons desiring to practice dentistry in this state must apply to the recorder for *revised rules* and for the proper blanks. Blanks must be carefully filled in and sworn to and with the fee, twenty-five dollars, filed with the recorder at least one week before the day of examination.

Geo. L. Parmele, M.D., D.M.D.,
Dental Commissioner and Recorder.

OHIO STATE DENTAL SOCIETY.

The thirty-fifth annual meeting of the Ohio State Dental Society will be held at Columbus, Ohio, December 4, 5, 6, 1900, at the Great Southern Hotel.

S. D. Ruggles, *Secretary.*

OHIO STATE BOARD OF DENTAL EXAMINERS.

The next meeting of this board will be held in Columbus, Ohio, beginning the last Tuesday in November, 1900. All those desiring to take the examination will receive full particulars and application blanks by applying to

L. P. Bethel, *Secretary,* Kent, Ohio.

NEW HAMPSHIRE DENTAL SOCIETY.

The annual meeting of the New Hampshire Dental Society will be held at the Manchester House, Manchester, N. H., November 6 and 7, 1900. All members of the profession are cordially invited to attend.

Fred F. Fisher, *Secretary.*

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

There will be a meeting of the Massachusetts Board of Registration in Dentistry for the examination of candidates, commencing Nov. 14, 1900.

Applications must be filed with the secretary before November 7. Application blanks and any further information may be obtained from the secretary.

G. E. Mitchell, D.D.S.,
25 Merrimack st., Haverhill, Mass.

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EDITORIAL.

THE UNRECORDED WORK OF THE PARIS CONGRESS.

In all representative dental conventions the net result may be divided into the obvious work of the convention and that other, and often more important, feature, the harmonizing of thought and aim growing out of personal intercourse. At no dental meeting has this fact been more clearly brought out than at the Third International Congress in Paris. The volume of work done will probably exceed anything heretofore accomplished, and, while a certain amount of it could have been omitted with benefit to all concerned, the great bulk of the scientific and practical work of the Congress was of a high order of merit. The organizers of the movement have worked indefatigably from its inception to its culmination to accomplish what they did,—viz, to create and carry to complete success the greatest dental meeting in the history of our profession. The machinery of organization was admirable, and carried out its great work without apparent defect. To the observer every detail was perfect, and, beyond all, the harmony and enthusiasm with which the dental profession of France labored with a single purpose to assure the final success of the undertaking will long stand as an object-lesson to their *confrères.*

The material success of the achievement we have already referred to in our previous issue, and further study of the facts serves to confirm the views then expressed. There is, however, another aspect of the subject which can be considered with advantage,—viz, the impetus which the meeting has given toward the unification of dental ideals in education and legislation. Our problem in the United States has been a difficult and complex one, from the lack of a sufficient restraining influence with which to keep in check the tendency to cheapen and degrade an honorable professional degree by conferring it upon the ignorant and incompetent. This difficulty is one which is peculiar to our form of government, and is not generally understood by our European colleagues, as it is a problem which does not arise in connection with a centralized form of government dealing with the control of a single state. As a result we are too frequently measured abroad by our educational defects, rather than by our best attainments. The multiplicity of standards among European nations is further confused and increased by our own lack of harmony in educational matters, when any attempt at international unification is made.

Efforts at international adjustment of dental qualification are handicapped and retarded not only by the difficulties stated, but by the general difficulty of arriving at a clear comprehension of the nature of the problem to be solved. Before we can attack it the problem must be clearly stated and understood, and the opportunity to do this was furnished by the great international gathering just closed. Various papers dealing with aspects of the subject were formally presented and discussed at the meeting, and to a degree aided in throwing light upon it, but it was undoubtedly the informal social discussions among those interested in these phases of our professional life which did the most toward bringing about a correct understanding of what had to be done and how to proceed in order to secure a nearer approach to uniformity in dental qualifications throughout the world.

The time is past when dentistry can be regarded as a local or even national calling. Good dentistry, dentistry of the highest class, is to be found among all nations, and the differences of opinion existing among the professional leaders of thought and action seem to be concerned mainly with the methods by which certain ends are to be attained, rather than what those ends shall be as representative of our highest ideals.

The social side of the Congress afforded a splendid opportunity for reaching a better understanding among the representatives of the several nations concerned, and the result is, to say the least, highly encouraging. We have contended in these pages that each had much to learn from the others before any decided advance could be made in the adjustment of international differences of professional opinions and methods. Europe has had the supremacy of American dentistry flaunted in its face *ad nauseam,* and has justly called in question our right to a claim which has such a monopolistic and exclusive ring to its sound. The defensive attitude of European practitioners against the invidious distinction which the phrase American dentistry implies has unfortunately too much justification in the blatant claims of superiority with which the advertising American quacks and impostors have flooded the cities and towns of Europe. It is this class of men who have brought discredit upon us, and are to a large degree responsible for the restrictions imposed upon legitimate American practitioners who would otherwise be cordially welcomed as professional colleagues abroad.

One has but to personally investigate the situation as it exists in order to be quickly convinced that the tendency to exclusiveness in European dental legislation is a legitimate act of self-defense against the ignorant and incompetent harpy who in the name of American dentistry is a discredit to the nation and to his calling. It cannot be a matter of surprise, therefore, that the native practitioners of Europe resent this invasion of their rights, or that, in view of their lack of full information upon the subject, they often fail to discriminate as to the meaning of the phrase American dentistry.

The Congress has served to bring about a better knowledge of these matters, and it is most gratifying to note that among those who are informed upon the subject the warmest and most cordial sentiments prevail with respect to the work done by American practitioners, and especially the ideals we are seeking to attain.

Ample evidence as to this cordial attitude of international relationship was furnished in the social intercourse of the delegates from England and America, at which a degree of sympathy and good-fellowship was manifested which effectually put at rest any question as to the harmony of interest and aim which should and must characterize the professional relations of the two great Anglo-Saxon nations.

France, in true harmony with her history and traditions, was not only the gracious hostess, but in her character as exponent of dental art and science gave an exhibit of her learning, skill, and ingenuity which was fully in keeping with her reputation as the mother of modern dental art. Germany, Holland, Spain, and Italy each gave evidence of an activity in all departments of dental science, art, and history which, taken together, definitely fix our profession upon a cosmopolitan basis, and make it necessary in future for us to adapt our plans and ideas to that conception of our profession which regards it as universal in extent and like science everywhere, knowing no limitations of language, and neither political nor geographical boundaries.

It is this advance toward a broader catholicity, higher professional ideals, and international courtesy which is the unrecorded and not the least important work of the Third International Congress of Dentists in Paris.

OBITUARY.

DR. WM. DEANE TENISON.

Died, March 11, 1900, at his home in New York city, from pneumonia, Wm. Deane Tenison, D.D.S., in his sixty-ninth year.

Dr. Tenison was born in Dublin, Ireland, in 1832. In 1858 he became a pupil of Dr. Crater, of Paris, France, and in 1860 began to practice in that city. Shortly after coming to this country he married, in 1863, in Brooklyn, N. Y., Miss Margaret Adelaide Bagley. His wife preceded him in death.

Having undertaken the course of study of the New York College of Dentistry, he was graduated with the class of 1876; and he ever cherished the comradeship of fellow-graduates of that institution as a member of its alumni association. He also became a valued member of the First District Dental Society, and in resolutions adopted by that body his professional brethren pay the following deserved tribute to his memory:

"In the death of Dr. Tenison the profession has lost a distinguished member. As a man he was genial and affable, as a dentist he was skillful and conscientious. Entering upon the study of dentistry at an early age when all was crude, he wrought his way to success and high position by zeal and industry."

Dr. Tenison is survived by his daughter, the wife of George T. Warford, M.D., of New York city.

DR. NEIL DOWNEY.

Died, June 6, 1900, at his home in Minneapolis, Minn., Dr. Neil Downey, in his fifty-ninth year.

Dr. Downey was born in Ohio, May 30, 1842. He served in an Illinois regiment throughout the civil war, and afterward lived at Fulton, Ill. For the purpose of learning the art of dentistry he left Fulton for Chicago. Returning to Fulton, he married and established a dental office in that city, where he practiced for some years. In 1875 he left Illinois for Minnesota, where, after two years spent in Austin, he finally established himself in Minneapolis. For twenty years he was one of the leading dentists of the twin cities.

He is survived by a son and a daughter.

DR. JAMES H. KIDDER.

Died, June 6, 1900, at his home, Lawrence, Mass., after a short illness, Dr. James Harvey Kidder, aged seventy-five years.

Dr. Kidder was born at Alstead, N. H., June 5, 1825, and was the son of Captain Ezra and Calista (Taft) Kidder. After spending his early boyhood on his father's farm he studied at Kimball Union Academy, and afterward at Dartmouth College, where he acquired special distinction as a debater, and from which he was graduated in 1850. He afterward studied medicine at the University of Maryland, and finally took up dentistry, studying with his brother, Dr. Frederick Kidder, at Claremont, N. H. He then opened a dental office in Lawrence, and here he continued till the end of his life, growing year by year in professional and social esteem.

Dr. Kidder had occupied the presidential chair of the Massachusetts State Dental Association, as well as that of the Merrimack Dental Association. He was of high standing in the Masonic fraternity. His religious convictions were decided, and he was acceptably prominent in connection with Grace Episcopal Church, with the Lawrence Y. M. C. A., of which he was one of the founders, and with the Lawrence City Mission, of which he was treasurer. His financial ability was marked, and his integrity was never questioned. He was president of the Pacific National Bank for the first twenty years of its existence, and was also active in the affairs of the Essex Savings Bank.

Dr. Kidder married, in 1860, Adelaide S. Dodge, daughter of George Dodge, of Lancaster, Mass. She died in 1896. Three children survive,—J. Harry Kidder, of Chicago, and two married daughters.

DR. E. HENRY NEALL.

Died, July 8, 1900, at his residence, Germantown, Pa., E. Henry Neall, D.D.S., in his sixty-third year.

Dr. Neall, whose name is so well known in the higher ranks of our Philadelphia profession, was the son of Dr. Elijah M. Neall, a pioneer in dentistry, and studied in his father's office the art to which his life was to be devoted. His specialty was the carving and baking of block teeth, in which line he was recognized as an expert; as late as 1899 he gave demonstrations in that difficult branch before the students of the Medico-Chirurgical College.

Practicing long before a college diploma was deemed necessary, Dr. Neall nevertheless, recognizing the advantage of possessing the same, matriculated in the Pennsylvania College of Dental Surgery, from which he was graduated in 1868. He was always active in dental society work, and was a member of the old Pennsylvania Dental Society, the Odontological Society, and the Pennsylvania State Dental Society. His services, moreover, were given at frequent intervals to the medical student, and he was upon the clinical staff of both the University of Pennsylvania and the Medico-Chirurgical College. Many minor devices and labor-saving tools in connection with his profession can be traced to his ingenious and fertile brain.

Dr. Neall was a Christian gentleman in the fullest sense of the word. He was a member of Calvary P. E. Church, Germantown, and an earnest worker in the Brotherhood of St. Andrew.

Dr. Neall was twice married, his first wife having been Miss Elizabeth

Enyard Montgomery, of Philadelphia; his second wife, formerly Miss Emily L. White, also of Philadelphia, survives him. He leaves six children by his first wife,—Dr. Walter H. Neall, Mrs. W. K. Matsinger, Robert M. Neall, Mrs. Charles J. Pilling, Benjamin T. Neall, and Miss Edith Neall.

DR. GEORGE W. HOFFMAN.

Died, April 7, 1900, from a gunshot wound, George W. Hoffman, D.D.S., of White River Junction, Vt., in his forty-sixth year.

George W. Hoffman was born at Island Point, Vt., in 1854. He was graduated in dentistry from the Cincinnati College of Dental Surgery. In his professional work he was a man of conceded ability. He was a member of the Vermont State Dental Association.

A man of athletic constitution and full of vigorous life, Dr. Hoffman found outdoor avocation compete with dentistry to engage his attention and interest. He was known throughout New England as an experienced turfman. He acted for many years as secretary of the State Fair Association. A genial man in private life, his personal courage and determination were nevertheless conspicuous attributes, and had won him a wide reputation. He met his death at the hands of a desperado, who with his father was being pursued by a posse under Dr. Hoffman.

Dr. Hoffman married, in 1880, Miss Harris, of Lyndon, Vt., whom he leaves his widow, with two daughters, Helen and Ruth.

DR. SETH W. HOWE.

Died, May 12, 1900, at Boston, Mass., Dr. Seth W. Howe, of North Attleboro, in his forty-fourth year.

Dr. Howe was born at South Weymouth, Mass., August 8, 1856. Since 1885, the date of his entering upon independent practice, he had resided in North Attleboro, Mass., and he will be much missed in that community, to whom his quiet yet genial and pleasant manners had so long endeared him. He had of late suffered from a troublesome tumor of some kind, and had gone for treatment to Boston, where he died.

Dr. Howe leaves a widow, formerly Miss Helen M. Abbott, to whom he was married August 20, 1896, at North Reading, Mass.

DR. SEDGWICK R. OSMUN.

Died, July 18, 1900, at Morristown, N. J., from paralysis, Dr. Sedgwick Rushing Osmun, in his sixty-second year.

Dr. Osmun was born September 26, 1838, at Hackettstown, N. J. About the time of attaining his majority he entered the dental office of Dr. Crane, of Belvedere, N. J. Having duly acquired proficiency he established himself, in 1861, at Hackettstown, and built up a practice. After a few years, however, he decided to make Morristown his home, and here he had practiced, at the time of his death, for a period of thirty-one years. Two of his sons adopted and follow their father's profession.

Dr. Osmun married, March 3, 1864, at Rockaway, N. J., Catherine Trowbridge, who preceded him in death. Three sons and one daughter survive.

DR. BERNARD M. GILDEA.

DIED, March 11, 1900, at his home in San Diego, Cal., BERNARD M. GILDEA, M.D., D.D.S., in his eighty-sixth year.

Dr. Gildea was born in Dauphin county, Pa., September 30, 1814. He became a pupil of his uncle, Dr. B. B. Browne, of St. Louis, Mo., in 1839, and in 1842 began practice in Harrisburg, Pa. In 1844 he removed to Philadelphia, which became his residence for many years. In 1859 he received his degree of D.D.S. from the Pennsylvania College of Dental Surgery.

Ill health caused him to remove from Philadelphia, and he went to New Orleans for a time, and thence to Louisville. In the latter city he practiced for many years, and here in 1871 he obtained his medical diploma as a graduate of the Kentucky School of Medicine.

Change of locality becoming a necessity on account of the precarious state of his health, Dr. Gildea left Kentucky for California, and for several years practiced dentistry in San Francisco, where he was the pioneer in the use of nitrous oxid anesthesia. After visits made to Hawaii, and then to Mexico and Cuba, he returned to California, where the climate of San Diego determined his choice of that city for his permanent residence. Here he acquired an excellent reputation as a citizen as well as a physician and dentist, and he built up a good practice.

He was a charter member of the Pennsylvania Association of Dental Surgeons, and later was a member of the Louisville Association of Dental Surgeons. During the last two years of his life, although compelled to relinquish practice, there was no flagging in his interest in the literature of the two professions, and to the last he was the same bright and genial and intelligent professional man.

Dr. Gildea married, October 10. 1858, at Harrisburg, Pa., Miss Anna M. Blessing, who, with an adopted daughter, survives him.

DR. HUGH McCOLLUM.

DIED, June 26, 1900, at his home, Geneva, Ohio, HUGH McCOLLUM, D.D.S., in his ninety-third year.

Dr. McCollum at the time of his death was known as the oldest dentist in Ohio. He was in good health and fairly active until his ninetieth year, when he had a fall, from the effects of which he did not recover. He was born November 4, 1807, in Clermont county, Ohio. He learned the trade of a jeweler and watchmaker in Cincinnati. While in Texas about 1835 his assistance was sought in the repair of a dental plate. This he effected, being helped out by obtaining some serviceable teeth from the skeleton of an animal left by the buzzards on the plains. This first "job" seems to have awakened within him an appetite for dentistry; he availed himself of any opportunity that offered to develop along that line, and about 1840 he opened a dental office in Augusta, Ky. Here the good quality of his work soon gained recognition. In 1869 the Ohio College of Dental Surgery conferred upon him the degree of D.D.S. He was a member of the Mississippi Valley Dental Association, and of the Ohio State Dental Association.

Dr. McCollum married, January 12, 1843, at Augusta, Ky., Miss Minerva J. Maxwell. She survives him, and he also leaves five sons and three daughters.

DR. EDWARD C. MCSHERRY.

DIED, May 8, 1900, at his home in Frederick, Md., from acute Bright's disease, EDWARD COALE MCSHERRY, D.D.S., in his fifty-second year.

Edward C. McSherry was born in Frederick, Md., March 5, 1849. In the civil war he espoused the Confederate cause. He served in the First Maryland regiment through the campaign of 1864 in the Valley of Virginia, and was present at Appomattox.

Having passed a dental pupilage during 1866 and 1867 with Dr. Edward Nelson, he received his dental degree in 1868 as a graduate from the Baltimore College of Dental Surgery. With the exception that he practiced in Scranton, Pa., from September, 1874, till March, 1877, Frederick was the scene of his professional life throughout.

Dr. McSherry married, October 25, 1871, Miss Alberta S. Cann, of Scranton, Pa. She survives him, with one married and three unmarried daughters.

DR. BERTRAND J. PERRY.

DIED, July 29, 1900, at St. Luke's Hospital, New York city, BERTRAND J. PERRY, D.D.S., in his fifty-second year.

Dr. Perry was born in Worcester, Mass., in 1848. He had lived, however, in New York since the age of seventeen. About thirty years ago he entered the office of Dr. Henry Nash, and afterward (in 1874) was graduated from the New York College of Dentistry. He enjoyed a large practice. He was a member of the New York Odontological Society, and of the Alumni N. Y. C. D. He leaves a widow (formerly Miss DeMotte, of New Jersey) and two sons.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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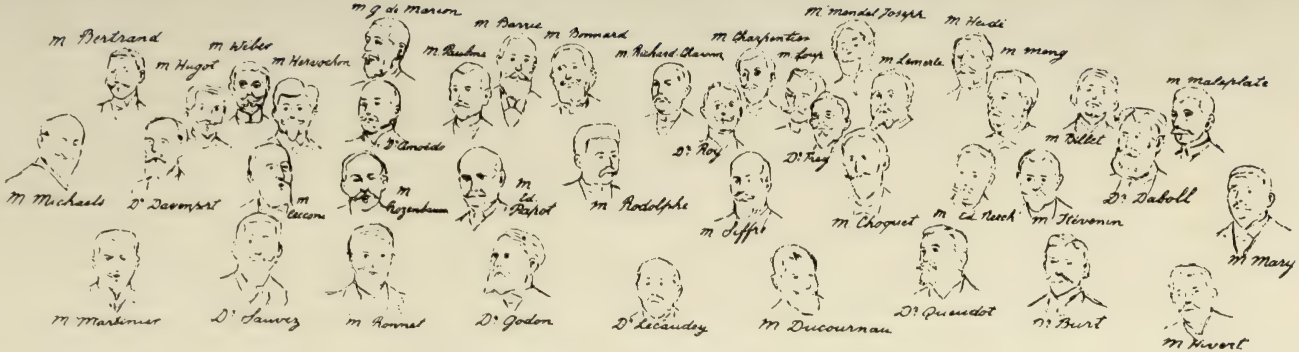
LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING AUGUST, 1900.

Aug. *7.*—No. 655,498, to Comegys C. Lusby. Hand-piece.
" " —No. 655,525, to Samuel C. Snyder. Tooth-crown apparatus.
" " —No. 655,640, to George H. Treadgold. Fountain spittoon.
" *14.*—No. 655,933, to Daniel O. M. Le Cron. Dental appliance.
" " —No. 656,124, to Ulysses G. Kinnison. Dental mallet.
" *21.*—No. 656,180, to James H. Downie. Nerve broach machine.
" " —No. 656,267, to Bernard Rubinson. Artificial tooth.
" " —No. 656,300, to David Perry. Dental root-canal drier.
" " —No. 656,556, to Chas. H. Lind. Dental cabinet.
" " —No. 656,596, to Robert E. Campbell. Detachable artificial tooth.
" *28.*—No. 657,002, to Herman D. Osgood. Dental impression-cup.

ADMINISTRATION



COMMITTEE OF ORGANIZATION,
THIRD. INTERNATIONAL DENTAL CONGRESS,
PARIS, AUGUST 8-14, 1900.

M. G. de Marion. M. Mendel Joseph.
M. Barrié. M. Heidé.
M. Bonnard. M. Charpentier.
M. Bertrand. M. Weber. M. Paulme. M. Richard-Chauvin. M. Loup. M. Lemerle. M. Meng.
M. Hugot. M. Hervochon.
M. Maleplate.
Dr. Amoedo. Dr. Roy. Dr. Frey. M. Billet.
Dr. Daboll.
M. Michaels. Dr. Davenport. M. Cecconi. M. Rosenbaum. M. Ed. Papot. M. Rodolphe. M. Siffre. M. Choquet. M. Ed. Neech. M. Stévenin.
M. Mary.
Dr. Queudot.
M. Martinier. Dr. Sauvez. M. Ronnet. Dr. Godon. Dr. Lecaudey. M. Ducournau. Dr. Burt. M. Hivert.

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ORIGINAL COMMUNICATIONS.

ON THE ASSOCIATION OF INFLAMMATORY CONDITIONS OF THE DENTAL PULP WITH CERTAIN ADVENTITIOUS DENTINS.

BY A. HOPEWELL SMITH, M.R.C.S., L.D.S. ENG., L.R.C.P., LONDON, ENG.

(Read before the International Dental Congress at Paris, August 8, 1900.)

A GOOD deal of time and labor have been devoted to the study of the histology and the patho-histology of the dental pulp by men of all nationalities, and representing every degree of knowledge; and much has been said, thought, and written concerning inflammatory states of this organ. It would be futile in the extreme to attempt in a short paper such as this to review all the past literature on the subject, or even to summarize the outcome of modern research. Scattered throughout the dental journals of the world are to be found fragments of laboratory work which must be pieced together by those who desire complete erudition upon inflammation of the dental pulp.

Here, however, an attempt will be made to briefly glance at the conditions named when associated with their normal environment; that is to say, it is hoped that this paper will be a slight contribution to our knowledge of the patho-histology of the pulp as it appears when the organ is retained *in situ.* To this end sections have been prepared by the author's method* (as well as Koch's balsam process), with the result that many new and important elements have come to light.

It seems to the author that little has hitherto been attempted in this direction; an acquaintance with papers and their illustrations reveals this fact. The drawings, in the majority of cases, fail to show the inflamed pulps *in situ* in their dentinal cavity on the one hand, or exhibit the dentinal cavities with the pulp tissue *in situ* on the other. As a result the correct relationship of the tissues existing in the peripheral region of the pulp is lost, a true conception of the real conditions being only to be obtained when the hard and soft parts are observed in their normal continuity. Many of Heider and Wedl's, Black's, Bödecker's, Magitôt's, Rothmann's, Salter's, and Tomes's exquisite drawings lack this very important point.

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*For details, see end of this paper.

Of the patho-histology of inflammation of the pulp there is but little new to be recorded. Basing one's conception of inflammation on Cohnheim's theories, it may be safely averred that inflammation in this tissue is governed by exactly the same principles as in other tissues of the body: that its microscopical anatomy is in agreement; that its modes of termination are similar, the whole condition being modified solely by the fact of the inclosure of the pulp in the hard dentinal walls. Thus, whether the inflammation is partial or complete, whether it is traumatic or idiopathic, whether there is exposure of the pulp or not, the blood-vessels are tortuous and are gorged with blood-cells (active hyperemia). Then follow diapedesis of the leucocytes and some red corpuscles, serous exudation, proliferation of the connective-tissue and other cells, and all the phenomena of passive hyperemia. These may pass on to resolution, or formation of fibrous tissue, or suppuration, or gangrene.

It is interesting and important to note that the majority of those enamel and dentin changes which accompany the process of dental caries are combined also with fresh formations at the periphery of the pulp which is contiguous to the breach of the free surface of the tooth. Critical examination of these new adventitious dentins reveals the fact that several varieties exist.

Before proceeding to discuss the patho-histology of these new dentins, the meaning of the terms "secondary dentin" and "calcareous degeneration" of the pulp must be clearly defined. The former was applied by Salter to all forms of dentin deposit, and this was correct in a sense; but to-day we require a more careful classification.

In a recent paper delivered before the Odontological Society of Great Britain, from which the author has drawn largely for the substance of this communication, a scheme of classification was submitted to the society which embodied all known kinds of dentin deposition in the pulp-chamber. And this scheme was approved by those present.

Pathological changes in the pulp, when combined with the formation of dentin nodules or deposits, may therefore be described as belonging to—

I. Calcareous degeneration of the pulp (changes occurring in the pulp *per se*).

II. Secondary dentin in the pulp (changes occurring in the primary dentin and the pulp).

III. Adventitious dentin in the pulp (changes occurring in the primary dentin and the pulp).

"Calcareous degeneration" begins in the center, and not at the periphery of the pulp, in the neighborhood of the arterioles and bundles of nerves, and far removed from the region of the so-called odontoblasts, and it is found in the teeth of the young (ætat. 14) and old alike. Its etiology can be traced to some condition of the vessel walls or their innervation, or to constitutional dyscrasia, such as gout or rheumatism.

"Secondary dentin" is occasioned by certain physiological influences, such as the occlusion of the dentinal tubules and the pulp-cavity in the teeth of the senile, or as a pouring out of calcified material by the pulp-cells when an injury has been received,—analogous, therefore, to the definitive callus that brings about the healing of a fracture of a bone.

"Adventitious dentin," however, differs from these, as we shall now proceed to show.

VARIETIES OF ADVENTITIOUS DENTINS.

It is more than probable that they have a common origin. In the tissues of an inflamed pulp, at an early stage, may be often seen tiny transparent globules like calcospherite spherules, to the type of which they no doubt very closely approximate. Absolutely structureless, they are found at the junction of the hard and soft parts, and also between the so-called odontoblasts, and occasionally in Weil's layer. Their origin, it is conceivable, is in the dento-genetic cells below the so-called odontoblasts,—whether brought about by a process of excretion or secretion is not at present clear. The globules may remain segregated or may become aggregated into masses, and on the rapidity or slowness of the process, on the inclusion or the non-inclusion of surrounding structural elements, depends the final character of the adventitious dentin. Thus if calcific material is poured out by the dento-genetic cells, and if complete coalescence of the globules ensues,—

First. A *hyaline* adventitious dentin is produced. The word "hyaline" suggests itself to the author as most expressive of the nature of this variety. Structureless, ground-glass-like in appearance, very finely granular, it reminds one very much of the hyaline matrix of articular cartilage; it is never fibrous. This would appear to be a slow-growing form of dentin, and is usually associated with chronic dental caries, and consequently chronic inflammation of the pulp.

Second. *Cellular* adventitious dentins are represented by the incorporation of a few nucleated and non-nucleated cells, rounded or fusiform in shape, in the substance of the dentin. The cells have been caught, so to speak, unawares, and have been unable to struggle out of the bony hood. Hence this occurs when the caries is not so slow, as in the case just cited, although the two varieties may be combined. When this happens it shows that the carious phenomena differed in the rate of their progression at different periods of the disease.

Third. *Fibrillar* forms contain five delicate connective-tissue fibers, derived either from the fibrous stroma of the pulp-tissue or from the branching fibers of cells. They are easily infected by means of micro-organisms which pass from the carious region of the dentin to the new structures beneath. Their manner of penetrating the tissues is possibly analogous to the way in which micrococci and bacilli produce caries in cementum by exercising a peptonizing influence over the soft matters contained in Sharpey's fibers.

Fourth and Fifth. These varieties are constituted by *laminar* and *areolar* adventitious dentin. The latter is one of the most commonly recurring varieties. The areolæ are crossed by five tubules, which may or may not be filled with round micro-organisms; as the tubules reach the pulp surface they enlarge, and finally terminate with wide mouths. The former is most often observed in chronic inflammations of the pulp deep down in the substance of the tissues. It reminds one of the "pulp-nodules" or "pulp-stones," which often afford such a stumbling-block to the proper cleansing of root-canals after devitalization of the pulp. But on microscopic examination they differ considerably, as they do also from those constant masses of irregularly shaped calco-globulin that are a constant accompaniment of pulp inflammation.

The micro-organisms found in these new masses of adventitious dentin are, as Goadby has recently shown, anaërobic and capable of producing acids. He has isolated two varieties, found, as he himself says, "occupying the van of dental decay in the deep layers" (of the dentin),—viz, those often "left in excavating a cavity." The first variety is *Streptococcus brevis;* the second *Bacillus necrodentalis,* a very pleomorphic, anaërobic, facultative aërobic bacillus.

It is perfectly obvious that the micro-organisms penetrate the new dentins through the tubules of the primary dentins. The soft tissues surrounding adventitious dentin exhibit the appearances of inflammatory tissue.

Nothing further need be said histologically about these tissues, except to point out the interesting fact that the layers of so-called odontoblasts are greatly increased in number and size, while their shapes only differ from the mutual pressure of neighboring cells. In no place are they seen in the act of forming either dentin matrix or tubule, or taking part in the formation of adventitious dentins, although they may sometimes be incorporated in them.

Conclusions.—The subject here only briefly sketched out is one of profound interest, but at present has only been entered upon by the author, who in venturing to point out the results of his original research hopes thereby to draw public attention, and especially the attention of other dental histologists, to the hitherto undescribed forms herein specified, and thus to arrive at a fuller knowledge of their pathology. Meanwhile, it is possible to so far summarize our knowledge, and to say,—

1. That in the majority of the inflammations, but by no means in every inflammatory condition, of the dental pulp there is found a protecting layer of hard adventitious dentin, which is put in the place of danger,—that is to say, opposite the breach, by caries, of the surface.

2. That these new dentins differ structurally, and may be now

known as areolar, cellular, fibrillar, hyaline, and laminar adventitious dentins.

3. That the cells called odontoblasts take no part whatsoever in the production of the dentin matrix, and therefore should not be called "odontoblasts."

4. That in spite of the processes which aim at the healing of the pulp after injury (carious),—attempts, *i.e.*, on the part of the pulp-cells (dentogenetic cells),—acid-producing micro-organisms invade the new dentin, proving a source of great danger by continuing their peptonizing influence, and having at least a tendency to bring about suppuration and gangrene in the midst of the pulp tissue.

5. Consequently, and finally, that the custom of "capping" exposures of the pulp,—no matter how slight they may be, no matter whether traumatic in their origin or not, no matter how carefully or hygienically or aseptically the operations may have been performed,—the custom of "capping" exposures, to repeat, is to be deprecated as a routine method of practice, except under absolutely the most favorable conditions it is possible to obtain.

Outline of the Author's Process of Preparing Sections of Teeth.

(Extracted from Transactions of Odontological Society, November, 1891.)

1. Immerse a newly-extracted tooth in Muller's fluid for three to four weeks, and remove to spts. vini rect. for ten to twenty days. Alcohol (eighty-four per cent.) or formalin (ten per cent.) may be used instead of Muller's fluid.

2. Remove, wash in water, and seal up apical foramen and soft parts with collodion.

3. Place tooth in 15 c.c. of following solution:

HCl (pure), 12 parts;
HNO (non-fuming), 30 parts;
Aq. dest., 108 parts.

Take 12 c.c. of ten per cent. solution of HCl, and at end of fifteen hours add 1.0 c.c. of HNO, and at end of forty-eight hours from commencement of immersion in acid solution add 1.5 c.c. of HNO.

4. Remove tooth at end of seventy-five to eighty hours, and wash in a solution of lithium carbonate (five grains to an ounce) for half an hour. Wash thoroughly with distilled water.

5. Divide tooth by razor into several pieces and wash again in water. Place each in gum mucilage (B. P.). Leave in mucilage twelve to fifteen hours or more.

6. Transfer to stage of freezing microtome, cut, wash sections, and stain with orange-rubin, or gold chlorid, or borax-carmine, or Weigert's solutions.

7. Dehydrate in absolute alcohol three minutes, "clear" in cedar oil one and a half minutes, and mount in Canada balsam.

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BACTERIOLOGICAL STUDY OF PYORRHEA ALVEOLARIS.*

BY GEO. W. COOK, D.D.S., CHICAGO, ILL.

(Read before the International Dental Congress at Paris, August 8, 1900.)

It would be interesting and also profitable to consider the views and conceptions hitherto held concerning disease, and especially those ideas held concerning the causation of "specific infectious diseases." But one short paper will not permit of such a history; suffice it to say that none of the earlier investigators had a clear conception of the factors entering into the causation of "specific infectious disease," neither at the present time can any one boast of a clear conception of such factors so as to render them capable of demonstration.

During the past ten or twelve years bacteria have been held as a very significant factor, and by some the only true and sufficient cause of specific infectious disease. But bacteria alone cannot cause disease, therefore some other factor or factors must enter in. While as yet we have not a clear conception of these factors, biological chemistry, which is now in its infancy, is throwing some light upon the subject, and we have reason to believe that future investigations along that line will demonstrate the connection between bacteria and certain biological-chemical changes which seem necessary for the setting up of a disease process by bacterial stimulation. At the present time our knowledge will not permit us to reason concerning the cause and effects of disease in the terms of an exact science, any more than we can at the present time interpret the phenomena of the cause and effect of life in a strictly scientific sense; yet we have a few facts out of which we may be able at least to construct a working hypothesis.

First, we recognize in all life processes, whether normal or diseased, an internal force inherent in the protoplasm corresponding in the inorganic world to potential energy, which, under the influence of external stimulation, exhibits the property of irritability, which is the chief phenomenon of life. The property of irritability which belongs to all protoplasm, if explained by natural law, is simply the manifestation of the chemical changes going on in the protoplasm by means of external stimuli, which results biologically in the transformation of potential energy into kinetic energy.

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*[Dr. Cook's paper was accompanied by the exhibition of a series of lantern-slide illustrations, which, for want of space, are not reproduced here.—Ed. Dental Cosmos.]

An equilibrium established between the potential energy residing in protoplasm and the intensity and quality of the stimuli constitutes a perfect state of health; that is, the intensity of the stimuli must be sufficient to liberate the potential energy of the protoplasm only in such quantities and within such a given time as the energy can be regained from other sources. If the stimuli are stronger than this fatigue follows, and a lessened irritability which, if too long continued, ends in a cessation of all life-phenomena,—that is, a state of stability or non-irritability.

The property of irritability depends upon the chemical constitution of the protoplasm molecule. The newer chemical conception of the constitution of the protoplasm molecule, as set forth by Loeb, furnishes an admirable hypothesis for the explanation of certain as yet unexplained phenomena. According to Loeb, the salts or electrolytes (Na, K, Mg, Ca, Fe, etc.) do not enter into the protoplasm molecule as a whole, but through their ions: "The great importance of these ion-proteid compounds lies in the fact that by the substitution of one ion for the other the physical properties of the ion-proteid compound are changed. We thus possess in these ion-proteid compounds the essential constitution of living matter, which can be modified as desired and hence in a measure enable us to vary and control the life-phenomena themselves." This also gives support to the assumption that the irritability of the protoplasm depends upon the various metal ions (Na, K, Ca, and Mg) entering in different proportions. This theory gives us some clue to the so-called predisposition to the deleterious effects of certain external bacterial agencies. Therefore, from a biological-chemical standpoint, predisposition to disease simply means that the egg (ovum) or the fertilizing stimulus (spermatozoa) and its environments are lacking in the correct proportions of the metal ions, so that development progresses abnormally, the resulting individual lacking in vital force. The result is inherited predisposition. Further, after development is completed the environment of the individual may be of such a nature as to destroy the ionic equilibrium of the protoplasm, which results in lessened irritability and life force. This is acquired predisposition.

Therefore, as already stated, the internal force or potential energy of the protoplasm depends upon the quality of the metal ions entering into the ion-proteid compounds, and upon their proper proportion. Upon this point depends the life and resisting power of the protoplasm, as well as its power to respond to external stimuli.

From the above premises we can state that the internal cause of disease in general is a disarrangement of the metal ions in the protoplasmic ion-proteid compound, brought about either by inheritance or environment; so that the protoplasm so constructed or modified reacts in an abnormal way to otherwise normal external stimuli, or it is not able to stand the effects of certain external stimuli which have the power to stimulate disease processes.

But this condition only lends opportunity, and is only a part of the cause of disease, having little or nothing to do with the specificity of disease, for a weak, abnormal condition of protoplasm may exist for years without any disease. Therefore there must be some external agency capable of stimulating or changing the chemical arrangement of the protoplasm in a particular way that is detrimental to its life-function. These external influences or disease stimuli are generally recognized as bacteria, and upon them depends the specific nature of disease. For example, two children are exposed to diphtheria infection; the one is strong and healthy, the other is weak and of low vitality. The infection will probably have no effect upon the former, while the latter will become infected and sick. The sickness is due to the low vitality of the child, but the specific nature of the disease, the reason why it is not scarlet fever, smallpox, or some disease other than diphtheria, depends wholly on the specific character of the external bacterial cause.

Again, a great many bacteria can produce a similar disease process. A dozen bacteria besides the gonococcus can cause pus and inflammation, but the specific character of gonorrhea depends upon the gonococcus alone. So all specific infectious disease depends upon, first, an internal condition inherent in the protoplasm common to all diseases, and an external bacterial stimulus which governs the specific nature of the disease. Both strychnin and morphin will cause sickness, but the specific character of the sickness depends upon whether strychnin or morphin has been used for the external stimulus.

This theory puts disease upon a biological-chemical basis, just as all developmental life-phenomena—irritability of protoplasm, etc.—are explainable on a chemical basis.

If our theory could be carried one step farther it is probable that tissue-metabolism is carried on through the stimulating influences of enzymes or ferments, just as all decomposition of organic matter in nature is brought about by the enzymotic action of bacteria. In the first place, we have what Hueppe calls normal tissue-stimuli; but, in the second place, pathogenic bacilli, having once entered the tissue, act in an enzymotic manner, causing chemical changes in the protoplasm which are deleterious to or incompatible with life.

Having now considered what are at present looked upon as the two factors entering into the causation of "specific infectious diseases," we wish to call particular attention to the external or bacteriological cause of pyorrhea alveolaris. We have no dogmatic statements to make, nor any claim to put forward as having found the bacterial cause of the disease, but simply wish to call attention to certain bacterial findings in connection with pyorrhea alveolaris, with certain suggestions and inferences drawn therefrom.

Bacteriology.—Space will not permit a full consideration of the bacteriological investigations of pyorrhea alveolaris. Malassez, Galippe, Whittles, and W. D. Miller have at various times investigated the bacterial side of the question, but with varying and somewhat contradictory results. Suffice it to say that all came to the same conclusion,—that it is of bacterial origin and local in its effects.

Some three years ago I made quite a number of cultures from pockets around teeth affected with pyorrhea alveolaris, and was attracted by the appearance of a certain organism seemingly not described by previous investigators, with the exception of Galippe, who described one somewhat similar. The work was then dropped. About a year ago Dr. W. J. Younger asked me to investigate the organism still further in connection with some work he was doing on the same subject, and which he submitted to the Institute of Stomatology in New York. This work was necessarily hurried and superficial, but was the starting-point of a more thorough investigation, which I now beg leave to submit to this Congress.

Cultures obtained from the pus contained in the pockets showed the ordinary pus-forming bacteria, together with, now and then, old and elongated forms of the organism in question. The difficulty of obtaining the organism in pure cultures and in an active state was that in the old deposits the germ was only found in a degenerated form, but down deep in the pocket, where the deposits were in an active state of formation, I was able to obtain the organism in nearly pure cultures and in undegenerated forms.

These deposits in which the germs are active are rather soft, grayish masses, and are rather easily crushed between two slides. Slides made from the old deposits and stained with the ordinary anilin dyes, also by Gram's method, showed a conglomerate appearance, varying from a coccus form to long leptothrix threads. Generally it assumed a bacillary form of varying length, just as though the leptothrix threads were broken up. These bacilli assumed a granular, conidia-like form, which showed a tendency to break up into cocci-like masses. They also showed a tendency to assume a branched thread-like form, such as is sometimes seen in the tubercle bacilli and more typically in actinomyces. In fact, I might use Hektoen's words in his description of actinomyces cultures, which he says are formed of cocci and rod-shaped masses and branching threads. The cocci forms and granules resemble very much the conidia as seen in many of the fungi. I found it difficult to secure cultures from the old deposits. Slides made from the deep pockets and from the lower deposits showed a bacillary form predominating. Cultures made from these parts grew readily in the ordinary culture-media, but showed a great variation in their morphological appearance. In the gelatin the cocci form predominated. On gelatin plate-cultures the colonies grew for the first twenty-four hours, after which they stopped growing and seemingly dried up. On agar-agar the bacillary form predominated, and in colonies showed a light-yellowish appearance. In from three to five days they stopped growing, and the bacilli assumed a diphtheroid form, seeming to pass into diplococci. This phenomenon is nothing more than spore-formation.

But in special culture-media, prepared by making a one per cent. glucose and one per cent. asparagin-agar-agar bouillon, the organism makes its appearance in long leptothrix threads, which in from five to seven days begin to divide and assume a bacillary form of no definite length. Some of the threads have clubbed ends, also a dotted or granular appearance. These granules are spores, which account for the cocci forms so often seen. These forms are similar to those seen in actinomycosis, with the exception that the latter do not present a jointed appearance.

When a gelatin culture is transplanted to a glucose-asparagin-agar culture it assumes the bacillary and thread forms, and when again transplanted to blood-serum a bacillary form altogether. In saliva from my own mouth it grows both as a cocci and a short bacilli, with no tendency to thread-like formation. In the saliva from a tuberculous individual it took on the long thread-like forms. In animal inoculations made from the organisms grown from the different media, that from my own saliva was without effect, but from the saliva of the tuberculous patient the rabbit inoculated showed symptoms of acute tuberculosis in eight days. The organisms were found in pure culture in the liver and kidneys, and presented their characteristic growths in the different media. Symptomatically, the rabbit died of tuberculosis, but post-mortem examination did not show any tubercular foci.

A second rabbit for control inoculated with the tuberculous saliva alone showed no sickness. A rabbit inoculated with blood-serum culture showed metastatic pus-pockets in the joints, and in one case in the rib. Cultures made from these abscesses showed the organism in pure culture. Inoculations from the glucose-asparagin cultures showed nothing more than a decided toxic effect.

One fact worthy of notice is that the organism does not grow, as a rule, around teeth in which the pulp has been removed or teeth that have been extracted, cleaned, and replanted for the cure of pyorrhea alveolaris.

The organism grows best at 37.5° C. At that temperature it forms long threads, and shows little tendency to break up. It will resist a temperature of 100° C. for ten minutes, after which it shows little tendency to form threads, but assumes the cocci and bacillary forms. Under its most favorable conditions the growing threads form clubbed ends, and in some instances lateral buds have been seen, resembling the forms noticed in actinomyces.

While this organism resembles actinomyces in almost every particular, there is one difference. The ray fungi do not divide by fission, as this organism does. This may be only an apparent difference; if so, we could classify the organism as a member of the actinomyces group of fungi, which are widely distributed in nature. As soon as a more suitable culture-medium can be found this apparent difference may be removed, and the organism be proved to belong to this group. Marshall Ward, of Cambridge, England, has called attention to a fungus which caused the loosening of the horns of cattle, which in certain media grew in long-jointed threads, while in other media the joints were not apparent. In the latter condition it resembles very much our organism.

While at present a classification is impossible, yet we are forced to conclude that this organism belongs to the fungi, and, along with actinomyces and other pathogenic fungi, is widely distributed in nature. Its analogy in morphology, and especially in the morphology of the disease process which it accompanies, to the class of diseases which are known to be due to fungous growths—namely, actinomyces, loosening of horns in cattle, etc.—is very striking. Another fact worthy of notice is that this class of fungi act largely in epithelial tissue, as represented in both horns and teeth, which contain keratin as a chemical basis. This does not hold true respecting actinomyces.

A noteworthy feature is that on the internal administration of potassium iodid, and less so of mercury, the organism quickly disappears from the affected teeth. That the iodids have a marked curative action on certain diseases of fungous origin has been fully demonstrated; especially is this true regarding actinomyces.

Conclusions.—This micro-organism, I have reason to believe, is as widely distributed in nature as the ray fungus and many others of its class. Also it may inhabit the mouth of an individual and lead a purely saprophytic life, but under certain conditions it is capable of assuming a pathogenic nature. This is in a measure true of all disease-producing bacteria. It is well known that the ray fungus exists almost everywhere, and that susceptible animals may come into contact with it time and again without being affected; or that it may even exist in the tissues of the animal without manifesting any pathogenic qualities. It is equally recognized that this same animal may suddenly contract the disease by coming in contact with it, or that the fungi already existing in the tissues may set up the disease. This is true of the diphtheria, tubercle, typhoid, gonorrhea, and nearly all pathogenic bacteria. For an example of this phenomenon, or the reaction of the individual to the bacterium which accompanies the disease, stimulating the disease process, we must revert to our first principle.

In nature I have found a bacterium possessing a characteristic individuality. I have more or less thoroughly traced out its life-history, studied its mode of life as grown in the different food-media, as well as its effects upon animals and in the mouths of individuals where it accompanied no pathological process as well as in those suffering from pyorrhea alveolaris. It seems to accompany all cases of pyorrhea alveolaris, especially down deep in the pockets where the deposits were in an active state of formation. I have also noticed that when the deposits were removed and the pockets disinfected, especially along with the internal administration of potassium iodid, the disease process ceased, and a reparative process began. If, after the pockets had been so treated and none of the germs remained, the affected teeth were reinoculated with the germ, the disease went on as before, whereas without reinoculation the disease tended toward recovery. But the question might be asked, Can we establish the identity of this organism to causation of pyorrhea alveolaris according to Koch's rules? namely,—

1. That disease-producing bacteria should produce no other effect than that of producing disease.
2. Their ability to produce disease should remain constant.
3. They should affect all animals in the same way, without reference to particular species.

4. They should produce only a single, sharply-defined, typical, and specific infectious disease.

We are forced to say "We cannot," and also to say that it is not necessary for a bacterium to fulfill all these conditions before it can claim a causative relation to a disease.

Pyorrhea alveolaris belongs to a class of diseases to which only a limited number of individuals seem to be susceptible, as is the case with rheumatism, gout, actinomycosis, cancer, etc., all of which are looked upon as being specific infectious diseases. Why do not these diseases attack all mankind, seeing that they are everywhere disseminated? We must look for an answer to the question in our first principle,—namely, the virulence of the micro-organism remaining the same, the resistance of the tissues of the individual to external bacterial stimulation must be decreased. The existence of disease-producing bacteria is also influenced by their environment, just as is protoplasm. In the mouth germs live in an environment subject to change. The saliva is a salt solution containing chiefly Na, K, and Mg ions, and, as Loeb has recently demonstrated, the life of a protoplasm, as exhibited in its irritability, depends upon the proper qualitative and quantitative relation of the ions in the environing solution. It is easily understood how a change in the salt-composition of the saliva, especially of the Mg ion, may materially affect the life of the bacteria. Should it so change as to lessen their irritability, their disease-producing qualities would be necessarily diminished. On the other hand, if the salts of the saliva are adjusted to their best needs their irritability is necessarily increased, as well as their disease-producing qualities. This chemical theory very nicely explains clinical observation respecting this class of diseases. To illustrate, rheumatism is considered a specific infectious disease, attacking only a limited number of individuals, while all others remain unaffected by the disease. Chemically, this is subject to the following explanation:

The ionic constituents of the environing fluids of the protoplasm become changed so as to lessen the life-process as exhibited in protoplasmic irritability; while at the same time such a change does not necessarily increase or decrease the vitality of the germs capable of stimulating the disease process, thus liberating the tissue energy in an abnormal way. But, on this theory, why does pyorrhea alveolaris affect only one or two teeth in an individual while the remaining ones are unaffected? This is probably due to a lowered vitality of the tissues in general, together with a traumatic aid in connection with the teeth affected. This is shown in the fact that if a thread be tied tightly around a sound tooth which is adjacent to a diseased tooth, so as to injure the gum of the sound tooth, it is very likely to become affected, whereas without the aid of the traumatism it would be able to resist the invasion of the germ. Therefore, traumatism figures very largely in affording an entrance for disease-producing germs.

But what lends its specificity to pyorrhea alveolaris? The effects of traumatism are the same,—inflammation; but the effects of all stimuli are not the same, any more than the effects of cocain and strychnin are the same,—each producing a specific set of symptoms and destroying the life of the protoplasm in its own peculiar way. Does this specificity reside in the tissues or in the germ stimulus? As already stated, the capability of reacting to a stimulus resides in the protoplasm, but the form of energy liberated resides in the stimulative factor. Example, the capability of reacting to morphin or cocain resides in the tissues or protoplasm, but the character of the chemical changes produced and the cause of the sickness following are governed by the specific chemical character of the morphin or cocain. So, also, the capability of protoplasm reaction to a bacterial stimulus resides in the tissue, but the specific character of the chemical change produced and its specific action on the protoplasm depend upon the individuality of the bacteria. For example, scarlet-fever germs never produce smallpox or diphtheria, any more than cocain produces the symptoms of strychnin.

Again, why is this class of diseases simply local, producing little or no general toxic symptoms? Other diseases, as diphtheria, while having a local focus which is the seat of bacterial action, also produce marked general toxic effects, due to the absorption of the chemical poison produced by the action of the bacteria upon the proteid matter. This is owing to the fact that the chemical products of all bacteria are not the same in toxicity. This is especially true of diseases chronic in their course. The chemical productions are formed so slowly that the system can dispose of them without trouble, the germ only being able to act upon the immediate tissue. This is well illustrated by the skin disease, psoriasis, which is purely local in its manifestations. This disease illustrates another phenomenon also true of pyorrhea alveolaris, that when the general health of the patient becomes impaired from any cause the local manifestations of the disease become more pronounced. This is also in keeping with our first principle, that the internal cause of a specific infectious disease is found in some chemical change in the protoplasm which lessens its life-force.

There are many changes I would like to call attention to, but I cannot at this time. I wish to state again that the bacteriological study of this disease is not complete; there are a number of microorganisms needing to be studied more fully.

I am much indebted to Dr. S. A. Mathew, Dr. F. B. Noyes, and many of my professional friends.

PORCELAIN ENAMEL INLAYS.

BY N. S. JENKINS, D.D.S., DRESDEN, GERMANY.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE first efforts to preserve carious teeth were of a simple nature. Lead was originally used as a filling-material, and hence the continental term of "plombe" for a filling.

Non-cohesive gold foil and amalgam came later, and finally the welding property of gold was discovered, through which the broken contour of diseased teeth could be perfectly restored; and for many years the reputation of being a brilliant operator in this noble metal was most highly and most justly prized. During this period the mechanical devices designed to facilitate the use of gold, such as the coffer dam, the dental engine, clamps, matrices, hand and electric mallets, etc., obtained marvelous development, and rendered the performing of successful operations possible even in most obscure and complicated cases. But these operations were achieved only at the expense of a great nervous strain upon both patient and operator, and often left the teeth liable to long-continued sensitiveness, and in exposed positions they were unsightly.

For some quarter of a century, however, efforts have been made to get beyond this stage by substituting for gold, fillings of porcelain, and a vast amount of ingenuity has been expended upon patiently grinding porcelain into cavities or forming cavities to fit already formed pieces of porcelain, or melting powdered porcelain into platinum matrices.

All these methods have had their eminent advocates and their unquestionable usefulness in practice, but their chief value has been in leading up to the discovery of an accurate and infallible method of making inlays which perfectly fulfill their purpose and which any reasonably skillful dentist can certainly learn to make with absolute perfection.

It is, for any competent man, only a question of taking the same trouble to learn this method which he took to learn how to use gold; indeed it is, mechanically, less difficult, although it requires a great range of accomplishments. He has to reverse much that he has formerly learned as to the preparation of a cavity for gold. He must avoid undercuts, abhor retaining points, disdain the preservation of cracked and discolored walls, and care not at all to keep softened dentin at the bottom of a deep cavity for fear thermal shocks should destroy the pulp. He must add to the knowledge of the surgeon and the skill of the artisan the painter's eye for color and the sculptor's sense of form. Then, when he has once mastered this system, his whole theory and method of practice will become exalted and his usefulness immeasurably increased. His patients will become far more tractable, and his labor, in consequence, less exhausting. For this system is not only a boon to the patient, but it is a relief and an inspiration to the operator. The terrible strain of packing gold, bit by bit, into a solid mass in a complicated cavity, while the suffering patient writhes in helpless agony, has passed away forever.

In its stead has come a method of deliberately and, for the most part, almost painlessly forming a cavity of which only an impression has to be taken, and the filling can then be prepared in the absence of the patient. When finished its insertion is immeasurably easier than gold, both to patient and operator, and in appearance, comfort, usefulness, and durability its superiority is manifest.

Of course this refers to the *perfect* filling, such as any good dentist can certainly learn to make. One great advantage of this system is in being able to discover before the filling is set whether it perfectly fulfills its purpose, and if this be not the case the work must be done over. It may occasionally be admissible in some cases to be content with a color which leaves something to be desired, or a form which is not ideal; but if the case is one which demands perfection of color and form, it is only a question of time and patience to obtain the desired result. Under all circumstances, however, a perfect fit must be insisted upon. If the inlay does not go exactly into place and present everywhere a perfect margin, some fault of preparation of the cavity or of manipulation in making or handling the matrix has been committed, and this fault must be discovered and corrected. Happily, this can always be done. It requires only intelligence and good will to assure that every operation should be accomplished in a perfect manner. For there is nothing mysterious in this system. It is as clear and as inexorable as a mathematical problem. Given such and such preliminaries, the result is perfection.

At first it was supposed that inlays were adapted to, or indicated in, only visible cavities. Experience has shown, however, that no other method of filling has so wide a range of adaptability. Supposing such a statement would excite general incredulity, I have taken the precaution to prepare a patient for your inspection, and I leave it to you to determine if such a restoration could have been possible with any other single material.

For more than the third of a century I have been at the head of one of the most widely extended operative practices in the world; a practice containing numerous representatives of all civilized nations, and one which has given opportunity for the study of the work of the most eminent dentists of Europe and America. In its development and management I have enjoyed the intelligent and loyal assistance of some of the most accomplished men our profession has produced, and now, after so wide an experience in the use, under such various conditions, of all the materials employed for the restoration and preservation of decayed teeth, and with an absolutely unrivaled experience in the use of inlays, I claim that the system I have had the honor of advocating before you is as superior to gold as gold was to the systems and materials which it supplanted.

SPECIAL WORK.

BY EUGENE L. CLIFFORD, D.D.S., CHICAGO, ILL.

In the last half of the nineteenth century medicine and surgery, or the science and art of relieving human ills, have made great strides, and we can but acknowledge that a considerable portion of this progress is the result of individual effort on the part of practitioners who have devoted special attention to particular lines of study and practice. Each succeeding year has added to the sum total of our knowledge of disease and its treatment, for which special work is in a large measure responsible. During the past fifty years the practice of medicine has been advanced to an enviable position among the learned professions. Every practitioner shares this honor, and if he is worthy he is more highly esteemed for the higher position his calling has taken.

As a result of special work disease has been classified and nomenclature simplified; what was once a chaos is now a relatively clear field. Obscure causes and conditions have been discovered and elucidated. True, the refinements of diagnosis sometimes seem exaggerated, but special work has done much to clear many obscure points. Symptoms have been grouped and classified, and the nature of disease explained in a manner impossible without special work, and the results are at the command of the general practitioner. New lines of thought have been opened up; clear descriptions have been given; verbal and pictorial illustrations furnished—these, too, at the command of all who could use them or profit by them. Treatments have been simplified and crystallized, new methods and measures introduced, and the crowning glory of all this special work is the free manner in which the results have been given to the general profession. With each advance the societies, journals, text-books and monographs, lectures, and clinics are utilized to spread the knowledge, and the endeavor is made to enlighten the general practitioner in each and every branch. Whose fault if the ordinary practice is not benefited and improved? Who can be blamed if such results are not absorbed and assimilated? Some difficulty, of course, lies in the wideness of the field and the intricacies of some of its branches; but much is quite understandable, and with a little more diligence the general practitioner could grasp and utilize far more than he does.

The relief and assistance being constantly given by the specialist to the general practitioner relieves much embarrassment, and redounds to the glory of the practitioner, the specialist, and the profession. The tendency of special work certainly is to advance a calling. That it will not advance every individual practitioner is equally certain. There has even been a danger noted by the pens of some that the growth of special work might tend to narrowness of mind and powers in both specialist and general practitioner. But with the proper use of advantages and with earnest and high purpose to do the best possible, the general practitioner can and should use the results of special work in such a way as to enlarge his powers and his usefulness.

To the busy practitioner problems are constantly presenting themselves for solution. It is very difficult at times to so solve these knotty problems as to render a cure possible, by means satisfactory to the patient as well as to the practitioner. In its broadest sense, we believe therapeutics to be the most important branch of study in any division of the healing art; upon its mastery depends so much of our success and satisfaction. In its study almost all of theoretical medicine is centered. Three very important ideas at once arise in the effort to fathom and control any particular case: First, what is the trouble? Second, what caused the trouble? and, third, how can I relieve the trouble in the least time and with the least possible discomfort to the patient?

Words are indefinite, liable to be misunderstood and to convey, too often, different thoughts from those intended. The profession of dentistry (in its title) stands for technical knowledge and skill, and, incidentally, a means of livelihood. "While professional interests must naturally take the first place in our thoughts, we should be ever mindful of the fact that the main purpose of our existence as a profession is for the public advantage."

In the beginning there were no specialists. During the years of the present century, however, the field of knowledge has broadened, and men, following their tastes or making use of their opportunities, while not entirely relinquishing the effort to be cyclopedic, are making the effort to become especially proficient in some one branch. This naturally tends to a neglect of the minutiæ of *all* branches of scientific effort save the selected branch, in order that they may have time to delve more deeply into the hidden things of the study of their selection. In other words, they specialize in a certain line of study and become specialists. What is the purpose of this action? It is two-fold: that they might unfold the cover from some of the mysteries and gratify a personal desire to more deeply fathom the unknown, and, secondly, the furtherance of knowledge in that certain line of work, the public being the final and greatest beneficiaries. History records many advanced steps in the field of general medicine, the result of untiring, unselfish, purely scientific work of the specialist. The retrospection of these advanced steps must convince the observant that the field of dentistry has so benefited and broadened under their benign influences that the very name which has so long and so graciously designated our work is beginning to be questioned by many in our ranks as to whether it is sufficiently descriptive to be retained. Stomatology, Oristry, etc., have their advocates, and why? Because many believe, with a late writer in the DENTAL COSMOS (Marshall), that more thorough training in pathology and therapeutics is an absolute essential to him who hopes to treat the deviations from the normal manifested within the oral cavity, and most certainly dependent upon systemic derangement; that "the demand of the time is for a higher standard"; that "study and research have developed the general interdependence of *all* the bodily tissues and their functions"; that dentistry is "a special department of medical science, embracing the structure, function, and therapeutics of the mouth and its contained organs, together with their surgical and prosthetic treatment"; that the time has passed when he who assumes the care of the mouth, and thus guards and protects the main portal of the entire organism, can feel that his work is accomplished by filling cavities and inserting teeth.

Accepting the definition as given above, and taking into consideration what this definition means, appreciating the conclusions which must be reached by the statement that all effort should tend toward *public advantage,* and that each and every patient is entitled to the highest skill and greatest comfort for every operation to which he submits, is it rational to expect that every practitioner within the specialty shall be an expert in all conditions, or does the future portend that our specialty must be again subdivided and that some practitioners will make the effort to perfect themselves in the line of their greatest ability, even to the neglect of some other fields of practice, so long as the effort does not involve the principle of his so doing? The conviction seems almost forced upon us that this specialization is not only desirable, but unavoidable. Truly the all-round man is an exception. Our field embraces so much, so many collateral arts and sciences are involved, so many dispositions, temperaments, likes and dislikes, must be considered, and the field is so large for the employment of whatever tastes the individual may develop. There are certainly grand divisions in dentistry: art and science, mechanics and theory. Some men are natural mechanics, and make most excellent dentists so far as that natural and cultivated talent can be applied. Some men are natural scientists, natural physicians and therapists, and to them certainly much of the accomplishments of the past and our standing to-day is due. To a degree these two faculties are conjoined in some with beneficial results, and what might be termed the general practitioner is evolved. But, having laid the proper broad foundation, cannot the man who is devoting his entire time, study, and experience to one class of misfortunes be better posted on the state of the art or science and its limitations and give to his patient more skillful handling and treatment than the man who is working six to eight hours a day in his office and three to six in his laboratory, leaving but little time for reading or fraternal intercourse? Then, again, different practitioners will like certain lines of work and dislike others. Certainly a man will cultivate that which is most pleasant to him, and the average man will show a tendency to avoid or shirk that which is disagreeable; and, on the old hypothesis that "practice makes perfect," better results will follow in the sunshine than in the shadows. The general practitioner of medicine becomes more expert in some divisions of his labor than in others, and the true physician never hesitates to invite the co-operation or seek the advice of a neighbor who has become an expert in the use of the forceps in a difficult case of labor, or a surgeon whose knowledge of anatomy and skilled use of the scalpel he knows will reduce to a minimum the danger of his patient and increase to a maximum his comfort and chances for recovery. Why should the dental practitioner, whose field has so rapidly and so greatly broadened, hesitate to take advantage of the same opportunities if at hand? Why are the advantages and opportunities of practitioners in metropolitan localities considered so much greater than those of his brother in the country? Mainly from the fact of the field being larger, his chances of professional intercourse and exchange of ideas and experiences, and the possibilities that in such a field he can select and cultivate that class of cases for which he has a fondness and more aptitude. No man should be censured for limiting his study to a particular branch of the healing art because of his fondness or aptitude, in order that he may have fuller enjoyment in his life-work or be of greater service in advancing his profession, when he carries into his limited practice the principles underlying professional life and the habits of the true physician. Exercising true consideration for the rights and privileges of his fellows, his life cannot help being in harmony with those members of the profession in general practice who observe a little care and consideration.

In what sphere of our general practice does the average practitioner of to-day feel most acutely his inability to accomplish, even by sincere, faithful service, all that he would desire in overcoming the effects of disease or accident as daily presented? We believe a large percentage would cry for help from the division of therapeutics and pathology. We believe that these divisions, of all others, are most neglected in our educational institutions, and we believe that the average practitioner in an average daily work will find less time, disposition, and interest in cultivating a field for which he has not laid the proper foundation and in which he feels his greatest deficiency. Our literature records the statement, for instance, that more teeth are yearly lost from gingivitis and its many sequences than from all other causes. Why is this? The *mechanics* of these treatments must be thorough and complete in the hands of many men that could be named, and the results of whose skill and labor in all other divisions of our specialty stand as monuments to their honest, untiring efforts. But have these same men had the time, disposition, opportunity, and aptitude for therapeutics and pathology that they have had for operative and mechanical technique? Does the future promise any relief? Have the recorded experiences and sentiments of some of our late writers any significance? Do not the present state of our knowledge and our present opportunities suggest the presumption that our power to combat these pathologic lesions is rapidly growing? And does it not suggest that the average practitioner must look for assistance to those who are denying themselves many of the emoluments of general practice and devoting their efforts toward finding the causes and overcoming the same through the parent profession of medical science? Certainly the main object of our existence as a profession *is for the public advantage*, and patients *are entitled* to every facility within our reach to guard, protect, and save their masticatory apparatus.

Certainly the field of stomatology offers some assistance to the general practitioner of operative or prosthetic dentistry that would add to his success in the treatment of these pathologic manifestations. Certainly the practitioner who devotes his entire time and practice to the study and treatment of the above-suggested condition should possess some facilities for diagnosis and treatment that possibly have been denied the general practitioner. Certainly all efforts in the general field are not sufficiently satisfactory to practitioner or patient as regards results obtained in the treatment of gingivitis and other oral manifestations of constitutional derangements. Certainly we believe that it is the experience of many that the results of their efforts toward a restoration of physiologic function and comfort are not *as rapid* nor *as permanent* as they would desire. Certainly, we believe, our sphere of usefulness to mankind can be broadened, our professional standard raised, and, incidentally, our yearly revenues increased by a little more attention to this class of cases, which have been so great a source of anxiety in the past.

As one who has done some special work in this field, I have discovered no "sure cures" or "specific treatments" for routinists. I have forced upon me the conviction that each and every case requires a special study of its own. Etiologic factors that seem unimportant or trivial to the casual observer, experience proves are of great significance to the specialist, and should receive due attention. Past years in college work, where infirmaries have furnished clinical opportunities, together with some experience in a private sanatorium, studying cause and effect in conjunction with esteemed medical associates, force me to conclude that all oral tissues are "within the influences of bodily environments and relationship," and their "study, care, and treatment form a part of that department of human inquiry and activity which we call medical science and art." Any interruption of a general function will certainly reflect upon the integrity of local organs or tissues, and any treatment intended to re-establish local function and comfort must be directed toward the *primary* cause.

While no amount of constitutional treatment can cover up or answer for careless or dishonest local attention, many of these conditions depend upon not one, but possibly several causes, and each cause must receive its due attention and, if possible, be removed. If this last can be accomplished, *success must attend our efforts if the foundation has not been entirely destroyed.* The *local* cause, I believe, is *always secondary*, the responsibility for the same resting in the fact of disturbed function, which fact becomes *primary*, and its etiology must be sought for. In this search what domains do we invade, what fields do we survey? Summarizing, as I must in a single paper, the answer will be, All those in which nutritional disturbances may arise and perverted function be the result. This you will see embraces all zones of physiology, and necessarily so when we recognize, as recognize we must, the interdependence of all organs and tissues. Each and every one of these zones becomes a theme within itself, and cannot receive just attention in the time allotted. Summarizing again, the history of each case, personal and family, often opens the windows of light upon our research; hereditary influences and tendencies cannot be ignored. Dyscrasiæ of any and all kinds possess their relative importance. Purity of the blood, integrity of the nervous system, perfection of digestion and assimilation lead on toward satisfactory nutrition, while, *per contra*, any deviations of the same tend to perversion, and sooner or later their results are surely manifested.

In assuming the care of a certain case, therefore, or in advising with *confrères*, the points upon which light would be sought would be—

Personal and family history.

Age, sex, and nationality.

General habits, whether active or sedentary, and if temperate.

Occupation, whether mental or physical.
Habits as to oral hygiene.
Temperament. Dyscrasia.
Are hereditary influences (constitutional or local) probable?
Is there any blood or skin affection?
Can we exclude tuberculosis, syphilis, scrofula, rheumatism, and gout?
Is digestion satisfactory?
Does constipation exist, chronic or acute?
Is there tendency to catarrh, general or local, acute or chronic?
Can we exclude the effects of medicines or poisons?
Is patient under medical treatment for any cause,—if so, what?
Do the kidneys functionate properly?
Are there deposits upon the teeth?
Character of deposits, salivary or serumal?
Does pus exude from the gingivæ?
Are the teeth very sensitive?
Can we exclude malposition and malocclusion?
Articulated models marking teeth and gums affected.

IF FEMALE.

Whether married or single.
Has she borne children rapidly?
Has she failed to conceive?
Any ovarian or uterine difficulty?
Has she leucorrhea, slight or severe?
Is she pregnant or nursing?

Thus the diagnosis comes first, the treatment afterward. And among the different problems submitted to the dentist for solution none are more urgent in their demands for relief, or, in many cases, more difficult to relieve, than the different phases of gingivitis and its sequences. There can be no question as to the value of special work in this field; shall we dig into it? Will the profession take advantage of whatever harvest may be reaped?

GOLD INLAYS.

BY WM. EDWIN PERRETT, DENTIST, VALPARAISO, CHILE, S. A.

On page 117 in "Notes on Operative Dentistry," by Marshall H. Webb, D.D.S., there is a chapter with the heading, "Summary of Principles Relating to Filling Teeth," and ten rules are given for the proper filling of them.

First he states that gold, properly used, is the best known material for the permanent preservation of the teeth. Secondly, that failure in operations is mainly due to the gold not being packed closely against the dentin and enamel at every part, thus allowing fluids to enter at such parts and further decay to take place.

That this is the principal cause that gold fillings fail so quickly there is no room for doubt, but how many operators can make a perfect filling with gold alone in all classes of cavities and teeth? Very few, if any, I believe.

Dental literature on the filling of teeth upholds this assertion, as the majority of writers advise the lining of cavities with one or more of the plastics where a metal filling is to be inserted. And it is on these lines that the gold inlay has been thought out and put into practice.

In the DENTAL COSMOS of September, 1898, in section Correspondence, under heading "Gold and Cement Fillings," I gave the *modus operandi* of the gold inlay, but for the benefit of those who did not see the article in question I will repeat it here.

Apply rubber dam; prepare cavity same as for ordinary gold filling, with the exception that retaining pits and deep undercuts are not necessary. The bottom of the cavity is then varnished with copal or Canada balsam, to retain in position the first pieces of gold. It is then built up piece by piece, holding it in place with an instrument (an old excavator will do) to keep it from rocking while malleting. When the right contour is obtained the filling is burnished and smoothed off with plug-finishing files.

Too much stress cannot be put on the necessity of using plug-finishing files, as on this depends whether your filling becomes pitted or not, as it is almost an impossibility to mallet gold to a perfect evenness and denseness all over the face of the filling. The use of the file also unites the molecules of gold into one solid mass, bringing the edges into close contact with the edges of the cavity. If the cavity has been prepared as above advised,—that is, without retaining pits and very slight undercuts,—and there is sufficient separation, the filling is easily removed, taking care not to damage the edges in so doing. It should then be put on one side, the cavity cleaned out again, as the malleting will have pulverized some of the tooth-substance, which, by the way, is the prime factor in producing that dark shadow or lining we so often notice under nearly all gold fillings after they have been some time in use. If thought necessary, the cavity may be made a little deeper. Cement is then mixed to a creamy consistence, the cavity filled with it, and the gold plug returned to place. A good, sticky cement like the Harvard is preferable.

If there is danger of pulp irritation from the use of cement, incorporate about one-third of hydronaphthol with the powder in mixing, or paint the cavity with chloro-percha. After the cement has set, the filling may be finished by any mode to which the operator is accustomed, but generally it is better to let the patient return for the final polish.

In fillings made by this method we have all the advantages of the two materials, gold and cement, without their weak points;—in gold its durability and resistance to attrition and the oral fluids, and in cement its plasticity and adhesiveness, which is so necessary to perfectly fill all parts of the cavity to prevent recurrence of decay and to produce the intimate union of the two materials with the tooth-substance.

To the dentist who has had any experience with porcelain inlays this method will appeal more forcibly, as he will find that he can make the gold inlay to be the exact counterpart of the cavity every time; whereas with porcelain it is only on paper that he can be so accurate, nearly always having to rely on the cement to patch up small defects.

In porcelain inlays the weak spot is invariably the joint, at which place the cement will always wash out; but with the gold inlay all this is obviated, as the gold is in contact with the enamel at every point, so that no cement is exposed.

While this method of filling is not recommended for all and every class of cavities and teeth, it has a decided advantage over the wedging method in the following cases: (1) In teeth of poor construction as regards their density; (2) teeth where the decay has been left so long that to make the cavity retentive the pulp has to be extirpated and removed, thereby causing discoloration, a serious matter in the mouths of our lady patients; (3) teeth of young children where it is deemed advisable to fill them with gold; (4) dead teeth where the cavity is so large that if we wedge gold in it we are liable to split the tooth.

By this method the greater part may be filled with cement, the gold facing made, taken off, some cement cut out, new added, and the gold returned to place, thus simplifying matters all round.

I may also add that it relieves the operator of the nervous apprehension that his fillings may drop out, as after five years' experience, during which I have inserted several hundreds of fillings made on this plan, I have yet to see the first failure in this direction.

SHOULD THE DENTIST USE THE MALLET?

BY E. W. WOOLEY, D.D.S., WINONA, MINN.

I HAVE been surprised and disappointed to see so many operators of good reputation who require their assistants to do their malleting, and would like to ask the profession, through the DENTAL COSMOS, some questions and offer some suggestions in the form of ideas that I have adopted. While there seem to be few who do not approve these ideas, yet there are few who practice them; and that is the cause of my disappointment at public clinics. Are there any reasons why a dentist should not do his own malleting, except that it is not easy to learn? If there are no other reasons, is it not to be regretted that this method is so commonly ignored? Who will claim that two hands on different bodies can be co-ordinated to work with the accuracy and precision possible of two hands on the same body? Do we need more fingers or less thumbs? And if the left hand is all thumbs, is it due to anything but lack of proper training?

I believe that malleting requires quite as much skill as holding the plugger, and the man who is well skilled in doing his own malleting has an advantage in the co-ordination of his two hands that can only be approached by the other method, however skillful the assistant. He strikes when and where he wants to, as fast or slow as he pleases, and does not strike when or where he does not want to. He won't nail a piece of gold down with one hand just as the other was about to fold it into another position. One hand understands the other. The varying positions of the plugger as it moves on and off the enamel-margin and changes its angle of direction require delicate and quick-changing transitions in the force and frequency of the percussion; and where the same volition prompts the action of both plugger and mallet there is no discrepancy between them, which means greater facility and better results. The discrepancy between two operators on one instrument will vary according to how well they are trained together, but in some degree is an ever-present impediment. So, however well skilled, the two can do less in this manner than one who is expert with the plugger in one hand and the mallet in the other, to say nothing of the further advantage of having the assistant free to do the minor parts of the operation, such as feeding gold, holding ligatures, etc.

The assistant may feed the gold and save the operator much time without affecting the quality of the work.

The helper, by carrying shingles for the carpenter, or brick and mortar to the mason, has no effect on the quality of the work, though without him the mechanic would require double time to accomplish the same results. The mechanic, whether carpenter, mason, shoemaker, or blacksmith, knows that the hammer affects the quality of his work, and he handles it himself.

If it were too much for one man to hold both hammer and nail, then it would take two men to make one carpenter; and when I see a dentist who, for the want of his regular assistant, is handicapped in the quality of his work, I can't help thinking that he is something less than a finished dentist, or that with him the division of labor is carried to a ridiculous extreme. My first preceptors, though without college training, handle gold with an ease and facility that I have yet to see equaled in other methods. They do their own malleting, use small cylinders of gold, and small, straight pluggers, securing the maximum of density and the minimum of excess gold to be dressed off in the finish.

The assistants, of course, feed the gold while the operators manipulate and condense it without interruption. Large approximal contour fillings in posterior teeth may be dressed flush and nicely finished at the gingival margin, even in a concave surface, by the use of an inclined disk, if it is done at the proper time, say when the gold is built up about a line from the margin and before proceeding to contour. But how can it be done after the contour has closed off access to the margin?

If files and scrapers are too crude to use in finishing a margin where results can be seen, disks are closed out, and strips will not effect a depression, if they could be applied to the mesial of a back tooth, what are we going to do at this vulnerable point,—which requires the finest work though it is not to be seen? This method of finishing the gingival margin before putting on the contour is so simple and practical that it requires no extra effort or appliances. When a farmer is building a fence he usually knows enough to hew a knot off from a post before he nails the board over it. Is there any better comparison?

All through the domain of mechanics great results are accomplished by a combination of genius with thorough manual training, and the constant pressure of practical application squeezes out incompetency; while "fake, fad, and fashion" are never let in. In the professions it is different, and, though dentistry is largely a mechanical art, too much genius is assumed and manual training is dispensed with. We are not only diluted with "fake, fad, and fashion," but patent-leather, plug hat, and pomposity stalk abroad among us like a cock in the barnyard whose crow is heard abroad, while the quiet hen industriously feeds her flock. Consequently there is much to detract from the best practical methods, which require close attention and thorough training.

Mathematics teaches us that no progress is possible in true science which is not consistent with logic and physical laws, yet there are different ways of getting a reputation; and if fortune favors a man with prestige and high position, his methods are sought after regardless of these principles. Now, for an instance and illustration,—it is better to be specific,—I have in mind a recent clinic given by a very prominent member ot our profession who condenses gold by use of the hand mallet. I expected to see him demonstrate the use of the hand mallet, and was disappointed, for he did not use the mallet at all. He held one end of the plugger while "Tom, Dick, and Harry" malleted on the other end in their turn, and each with a gait of his own. The cavity was mesio-occlusal of the upper right first molar, which affords direct, easy access. They worked a half-day, but a good deal of time was required to dress off excess gold, and I was surprised at the quantity of disks and vaseline that was used. I wondered why the doctor did not dress the overhanging excess at the gingival margin before covering it with the contour, but was astonished when he finally left it there with the announcement that Dr. So-and-so at some future time would fill a cavity in the adjacent tooth and incidentally finish *his* operation. Then the occlusal and more accessible surfaces were finished with a shining surface, unrelieved by ridge or sulcus, and the doctors stood and expressed their admiration like so many novices. Had I not seen my preceptors do similar operations more expeditiously by doing their own malleting without an assistant, and, still better, with the assistant feeding the gold, I might have been more appreciative at this clinic. It was remarked that the doctor was under great disadvantage in the absence of his regular assistant, and that in his own office he could do a similar operation in one-third the time. Then it would appear that it takes two to make a dentist where these methods are employed, and as often as they are separated excuses are in order for the results of the work. But the man who does his own malleting has no such excuses, especially when surrounded by supplies from two or three depots.

DENTURES FOR EDENTULOUS PATIENTS WITH THE GOUTY DIATHESIS.

BY WILLIAM BOOTH PEARSALL, F.R.C.S., DUBLIN, IRELAND.

GOUTY conditions of the edentulous mouth have not received much attention from dentists. I have looked over most of the standard books, but there is little or no reference to a condition of discomfort, not infrequently accompanied with pain, experienced by patients "without a tooth in their heads."

In the course of a general dental practice extending over thirty years a dentist unconsciously preserves in his mind facts and experiences that do not seem to him important or new till a group of similar cases or experiences again occupy his attention. It has been my lot in practice to have to deal with many edentulous patients of a gouty diathesis, and I will endeavor to describe what I have personally observed in such cases and how the painful condition so often complained of can best be treated.

I have been told that few cases of gouty diathesis present themselves in the United States, which may possibly account for the paucity of information to be gathered on this point of practice in the standard books. Among the well-to-do classes of patients in Great Britain and Ireland there are many who suffer from gout or rheumatic gout. There are certain manifestations of the disease that come under direct observation of the dentist, which, so far as I have been able to ascertain, although familiar to me for several years, do not appear to have been placed on record.

Over and over again I have been consulted by edentulous patients, of my own and of my professional *confrères,* who were suffering from a phase of gouty discomfort in the mouth that to many is almost unbearable. The condition is one of tenderness of the periosteum, extending over the maxilla or mandible, without any redness or swelling, such as we usually notice in gouty or rheumatic affections of the joints. The patient tells you that he has been wearing dentures, with or without springs, for several years without discomfort; that latterly he has been thoroughly miserable, the pain being ascribed to either jaw, as the case may be; that it has been painful to speak or eat for some hours or days. And observant patients will tell you that the pain is "under the gum"; that is, between the bony structure of the jaw and the gum. The pain is commonly described as "burning," and is paroxysmal in character. Sometimes it is described as "gnawing," and almost unbearable while the dentures are in the mouth. In many cases examination of the mouth will show nothing but an apparently healthy mucous membrane, free from any abrasion or bruises from the use of dentures.

If the dentures are replaced in the mouth and examined *in situ* they will often enough be found to fit the surfaces of the alveoli quite well, but the patient will wince if moderate pressure is placed on the denture when resting on the affected jaw. In many instances patients are impelled by the discomfort they experience to remove their dentures for hours, even in the daytime, although the removal does not remove the pain. Patients, indeed, often remark with much asperity "that when they had their own teeth they never suffered like this." The pain endures for hours, and comes and goes in paroxysms, never ceasing during the attack, which may last from twenty-four hours to three or four days before relief is sought at the hand of the dentist. The patient usually ascribes the discomfort to something having gone wrong with their artificial teeth, "for they never hurt like this before."

Bathing the mouth with warm water sometimes gives temporary relief, and patients do this not infrequently without asking advice, as cold water is too painful to use, although the mouth feels hot under the gum.

In many cases patients show the characteristic of an impending attack of gout. The face is pale and puffy, the eyelids tender and sometimes red, the conjunctiva of one or both eyes showing the bloodshot condition we often see in the gouty patient. There is irritability of temper and manner, so often associated with a gouty diathesis. The digestive apparatus is commonly out of order, and tenesmus is a frequent condition. In fact, the main characteristics of these irritable patients are those with an impending attack of gout. The tongue is white and "livery-looking"; not infrequently the skin will give off the unmistakable odor commonly observed in gouty patients. When this is observed by the dentist his duty is to send his patient to the medical attendant for systemic treatment.

I have often been amused, when the skin odor is present, to find patients declare they *never* had gout, and that a dentist cannot know anything about it; so that I have been compelled to offer them the alternative of permitting me to stamp on a great toe or to send them with a letter to their physician.

If, happily for the patient, the attack of gout settles in the hand or foot or in the digestive tract the pain in the mouth vanishes like magic, and the dentures can be used for speech and mastication as before without any alteration. No discomfort will be felt in the mouth for months, till another impending attack of gout manifests itself by pain in the periosteum of the jaws.

In some of the cases that have thus consulted me metal plates have been used for both dentures, and were usually of gold. In others vulcanite has been used, but it has long been borne in upon me, as the result of patient observation, that a gouty patient with an irritable periosteum should not wear vulcanite dentures. Patients of a gouty diathesis with an irritable periosteum too often find it difficult to wear vulcanite plates, owing to the sense of heat and burning the non-conductibility of the vulcanite sets up in the mouth.

I have had a prejudice myself for many years in favor of wearing some form of metal plate next the gum, for the following reasons: Absorption of the alveolus under the metal plate is much slower than under vulcanite, and the metal plate is stronger and less likely to get injured. The metal plate responds to the heating and cooling of the mouth when influenced by food or air, and the mucous membrane maintains a better condition of health as compared with a similar case in which vulcanite is used. It is my opinion that gouty patients, and especially those with an irritable periosteum, should always wear metal plates, but what kind of metal the following notes of cases will perhaps afford a clue:

During the past six years I have had to attend and treat seven edentulous patients who were of a strongly marked gouty diathesis. All these patients had been wearing dentures for years "with the greatest satisfaction" till the irritable condition I have described set in. Three of them happened to be intimate personal friends who are unusually gifted with powers of observation, and who can answer pertinent questions in a frank and reliable way. One patient is a professional man, a specialist, and at the head of his profession. He lost his teeth comparatively early in life—about the forty-fifth year—from what is now comprehensively known as pyorrhea alveolaris. He was carefully treated when the teeth had become seriously loose, but the treatment was not effective because the sockets had vanished before he bethought himself of getting anything done. He has had to wear dentures for the past fifteen years, and is quite expert and intelligent in their use. Thanks to his great intelligence, I have been able to experiment upon him by making different kinds of dentures; and as he has to speak in public, and also to teach large classes, clear enunciation is important to him. He is a gouty subject, and has suffered from time to time as I have described. I have made for him dentures of vulcanite, using tin foil or tin models to vulcanize upon, so as to get as good results from the rubber as possible in the way of toughness and high finish on the surface. I have made also dentures with gold plates, and also of continuous gum, using for the latter hard platinum plate perforated with holes, as recommended and described by my friend Mr. J. H. Gartrell, of Penzance, Cornwall, England, who has done so much to make continuous gum a practical process.

With all these cases there was at times a certain amount of discomfort before a gouty attack was imminent, but it was never necessary to adjust the margins of the dentures.

During a visit to Chicago in 1895 Dr. L. P. Haskell showed me some aluminum plates he was making with vulcanite attachments for the teeth for edentulous patients, and he assured me that his patients liked the aluminum metal far better than gold. This metal has many advantages as it is prepared nowadays, and I was induced to try it for my friend, who was always so sympathetic with experimental efforts to make him comfortable. The new dentures were made with pure hard-rolled sheet aluminum of a suitable thickness. Sittings were given to test the plates, to take the bite, to try the occlusion of the porcelain teeth. The work was finished and adjusted to the mouth. The patient volunteered to take notes of all the points that might arise in his experience of the new metal. His report was very gratifying, as he was good enough to say that, with the exception of a slight taste of zinc for a couple of hours, he never was so comfortable. He had tried the use of his ordinary food, hot and cold water, acid fruit, without any discomfort whatever. He declared also that he could *taste* all kinds of food *better* than with any other dentures he had ever used before. He has had no discomfort from his periosteum since he has worn aluminum plates, and he never uses any of the other dentures, although he was not only accustomed to, but comfortable with them, with the exception of the periosteal pain from time to time before an attack of gout in his hands or feet. He considers that aluminum has advantages for gouty patients no other material can give. Before I made him the aluminum dentures he had preferred to use the continuous-gum dentures.

Another case, that of a lady who had been wearing gold dentures with vulcanite attachments to the porcelain teeth and gold springs for years, came to me complaining of the "heat of her mouth." She has the deformed fingers of the chronic gouty patient, "chalk stones," in fact. There was nothing of moment with regard to the fit of the dentures, nor was there any bruise on the gums from excess of pressure or misfit of the dentures owing to the wasting of the alveolar ridge. The patient was very free with her tongue, in caustic comments of the dentist's lack of resource in dealing with such a case as hers.

I suggested the use of aluminum plates, bearing in mind my experiences with my intelligent friend a few months before. I had indeed some misgivings with regard to a possible galvanic action set up by the use of gold swivels and springs connecting the dentures. The dentures were made in the usual way, with thick rolled pure hard aluminum plates, and gold swivels and springs were used. This lady has been wearing the aluminum base-plate dentures for four years without any return of the periosteal pain in the mouth, and she has recently written to me with respect to making another aluminum set of dentures, as she cannot bear the gold ones; "they have a horrid taste."

I may mention that there is no evidence of galvanic action from the use of the springs, as they are carefully insulated by the vulcanite from any contact with the aluminum. This lady has always kept her dentures in beautiful order, and the gold plates were as smooth and well polished as if they had just come from the polishing lathe, yet she complained of a "horrid taste" and the burning pain in the jaws "inside the gums."

Another lady followed who was wearing a gold and vulcanite denture on the maxilla and a vulcanite denture on the mandible, and declared it felt like "scored pork"; that the burning feeling on the alveolar ridge of the mandible "was wearing her out." She was about sixty-five years of age, with the swelled and enlarged finger-joints of the gouty patient. I could not find any evidence of undue pressure, as there was an excellent occlusion between the dentures; and when the jaws were clinched there was no "whitening" of the gum, such as we see when strong local pressure takes place. An aluminum-lined denture was made for her in which I was careful to copy the area of pressure of the vulcanite case that caused the "scored pork" feeling, whatever that might be. With the aid of Mr. J. H. Gartrell's tag punch suitable attachments were made to hold the vulcanite supports for the teeth.

The patient used the aluminum-lined denture at once, and, beyond some slight adjustment with the aid of articulating paper in the mouth, she has been perfectly comfortable, and has never experienced the burning or "scored pork" pains.

The other cases I have had resemble those I have described, so that I need not describe them further in detail. In every case the symptoms of gouty periosteal discomfort vanished with the use of aluminum base-plates. All the patients agree that the function of taste is more acute with an aluminum plate than with other metallic or vulcanite settings for artificial teeth.

I use pure *hard* aluminum rolled into sheets, and of No. 10 Birmingham wire gauge, which corresponds with No. 11 Ash's gauge. The plates are swaged with metal dies in the usual way. When trying them on the mandible I am careful with a suitable pair of pliers to turn up the edges over the mylo-hyoid ridge, and at the attachments of the buccinators and the frenum of the tongue and lower lip. By doing this to the mouth of the patient, and by deliberately pressing the plate on the mucous membrane and gum firmly with the fingers or thumbs, all pain from edges will be avoided. Vulcanite adheres beautifully to the aluminum plate just as well as to gold, and the resulting denture is strong and light, so that for suction cases in ordinary practice very excellent results can be gained.

From the experiences of these patients I am of opinion that aluminum plates give a further resource in the treatment of edentulous patients with the gouty diathesis.

A CONTRIBUTION TO THE STUDY OF THE DEVELOPMENT OF THE ENAMEL.

BY R. R. ANDREWS, A.M., D.D.S., F.R.M.S., CAMBRIDGE, MASS.

(Read before the International Dental Congress at Paris, August 9, 1900.)

THE subject-matter of the essay which I have the honor to submit to your consideration at this time is "The ameloblast, and the part it plays in the formation of the enamel." The results of earlier investigation, made nearly fifteen years ago, were demonstrated at a meeting of the American Academy of Dental Science at Boston in 1888, and afterward read before the Dental Section of the International Medical Congress at Berlin in 1890. These earlier investigations were begun with the intention of verifying the conclusions of those writers who believed that the enamel was formed by cell-calcification. I proved conclusively that this was only true in part; that lime-globules formed in the ameloblasts, the lime coming from the blood-supply. This soluble lime formed a chemical union with the plasma of the cell, resulting in the formation of glistening, minute, globular bodies, in which was proved to be lime by the usual chemical tests under the microscope. I had proved that minute lime-spheres (calcospherites) were also to be found in the meshes of the enamel-organ by the same chemical tests before enamel was formed; that is, while the organ was in its perfected state, following Dr. Sudduth's method, and before the external and internal epithelium had fused together at that point where enamel was first to be formed, and before the connective tissue, with its vascular supply, had become adjacent to the stratum intermedium, as it does before the formation of enamel. I found that these minute, glistening bodies (calcospherites)—sometimes called enamel-drops or lime-crystals, and since proved to be a chemical combination of lime with a globular organic matrix—apparently merge into one another in the ameloblast and become larger as they approach the formed dentin, until they reach their normal size over its already formed cap. These globules become, by a further calcification, a section of the enamel about to be formed. They are surrounded by a plasma which is the cementing substance between adjacent forming rods, and these globular bodies form one above the other to build up the rod by successive stages. I also demonstrated at Chicago, at the World's Columbian Dental Congress, in 1893, that there was a fibrous supporting substructure, which I had found apparently forming from the stratum intermedium, and supporting as a scaffolding these globular bodies as they formed the rods. In teasing thin sections of the enamel-cells from the stratum intermedium fibrous strings were left bridging the opening, apparently having their origin in the cells of the stratum intermedium. And in teasing the ameloblasts apart I found the same fibrous structure between them. I propose in this paper to give the results of my later investigations, and, as there has been so much controversy as to the nomenclature of the cell contents, I propose in the first place to do what I can to clear it up in a comprehensive manner.

I assume that we are all familiar to-day with the processes of tooth-development. The ameloblast is the enamel-forming cell found everywhere over the forming dentin. Wilson, in his work, "The Cell in Development and Inheritance," well says that the term cell is a biological misnomer, for, whatever the living cell is, it is not, as the word implies, a hollow chamber surrounded by walls. The definition of Max Schultz, that the cell is a mass of protoplasm containing a nucleus, would apply to the ameloblast much better, for the ameloblasts are merely masses of protoplasm, each containing its nucleus, that have been given their prismatic and columnar form by mechanical pressure of surrounding structures, or by unequal growth and differentiation, or by active movements of the cell-substance. The word cell, however, has become firmly fixed in scientific nomenclature, and all efforts to replace it by a better name have failed; we shall therefore be compelled to use the term cell in describing the individual ameloblast.

The former term for the contents of the cell is protoplasm, which is described by Foster as a viscid, translucent, and granular substance, either continuous or interrupted by more or less spherical spaces or vacuoles filled with fluid, often forming a network or sponge-like structure extending through the cell body, and showing various structural modifications in different regions and under different physiological states of the cell. Lodged in the protoplasm, discontinuous with it, and forming no part of it, are other collections of fluid or discrete granules, held either in the threads or substance of the protoplasm or in the vacuoles or meshes.

Although we cannot distinguish between those parts of the cell which are living and those which are to become living, and those which have ceased to be living, in their various stages of change, yet in a general way protoplasm may be said to be the living substance of the cell. In the ameloblast we find this living substance or protoplasm is differentiated into two very distinct parts, nucleus and cell-substance, the most important of which is the nucleus. To this nuclear substance recent nomenclature has given the name karyoplasm, while to the cell proper has been given the term cytoplasm.

In the ameloblast the living matter is always undergoing chemical and morphological changes very much as it is in gland-cells,—namely, a building up and a breaking down, with respectively a storing up and a setting free of energy. This process is called metabolic activity of the living substance. The ameloblast in life is continually taking in or ingesting soluble substances.

The ameloblasts are specialized cells, their function being only to form the enamel; and this function ends with its formation. We are not expected to find in the ameloblasts, indeed we do not find, all the structural appearances that are found in the typical animal cell, but enough has been seen to show that there exists within it a reticular structure which is the cytoplasm of the cell.

When the process of enamel formation is about to take place at about the first of the sixth month of fetal life, we observe that at the point of the forming tooth the connective tissue with a rich network of capillaries has come into close proximity to the open ends of the ameloblasts, a layer of cells from the stratum intermedium only being interposed; the external epithelium of the enamel-organ and the cells of the stellate reticulum have disappeared from the part, and amelification is about to begin. The spindle-shaped cells of the stratum intermedium are by many authors credited with having changed into a sort of connective tissue, and the ameloblasts at this stage strongly resemble gland-cells, being little more than a mass of protoplasm with a nucleus. These form a layer of columns over the already calcified dentin. I assume that we are all familiar with the appearance of the developing tooth at this time. As I have shown, the first indication of enamel formation is seen in the substance of each of the ameloblasts nearest the dentin. These appear to be globular or mulberry-shaped masses, which are deposited directly upon the formed dentin in a mass of cementing plasm, where they form the first segments of the rods which are to form the enamel. The cement-substance is apparently of the same nature as the plasm contents of the cell body. It is my purpose in this essay, so far as I may be able, to describe to you the changes which take place within the ameloblast to bring about these formations, but before doing this I wish to call your attention to some valuable results found in a paper which appeared in the December number of the *Journal of Morphology* of last year, entitled "The Calciferous Glands of the Earthworm," by Nathan R. Harrington, in which he shows the methods of formation of lime-bodies within the cell-structure in this low form of animal life.

This type of calcareous-forming cell offers particularly valuable opportunities for studying its glandular activities, in that each cell is distinctly isolated from adjacent cells, and in its primitive form successive morphological changes may be observed. In Mr. Harrington's following description of the cell activity, note the similarity between the formation of the globular calcific bodies and the similar formations in the ameloblasts. His researches show how glandular tissues recuperate after the waste caused by secretion; how the regenerated cell-substance is transformed into specially differentiated material, and how these products of secretion become released from the cells. To this investigation his material was well adapted, for the lime-producing cells in this instance are almost isolated from each other in the natural state, and the cell activities can thus easily be studied in their various morphological changes. Also any desired stage in the cell's history could be obtained by feeding the worm normally through the soil in which it burrows. Harrington found that stimulation thus induced with acid food caused an oversecretion of the glands, and thus the study of the constructive stages in the lime formation and the resultant degeneration were greatly facilitated. He noted that the nuclei are all oval, small, with heavily staining granular chromatin and feebly defined nucleolus. The cytoplasm is dense and composed of elements closely knit together. In a later stage the cytoplasm expands a little about each nucleus; a slight projection is raised up, and as the action proceeds the cytoplasm continues to increase in extent. It becomes less dense, and vacuoles appear here and there. The nucleus becomes decidedly vesicular, the nucleolus large and densely staining. In normal worms this stage represents the height of constructive activity, and the cell is now ready for the changes which will result in the formation of lime-crystals. There can be no doubt that the secretion occurs in its final form inside the cell before the latter is broken down. Minute round globules appear at the nodes in the reticulum and almost fill the spaces, or alveoli, between the loose cytoplasmic network. Sometimes a single shred of the cytoplasmic substance can be seen in the gland cavity with a few of the crystals attached to it. In a cell which has passed the height of constructive metabolism these globules may be seen shooting out, as it were, from the nodes of the disintegrating cytoplasm, apparently having grown in much the way that mineral crystals form in a strong solution.

Harrington says, "Although I have very distinctly made out the small crystals (globules) inside a cell which has not yet broken down, and have seen them dissolved by acid, it is quite impossible to determine whether they are derived from the reticulum or partly from the cell sap which fills the spaces."

This observation of Mr. Harrington is of much interest to me, for in my own investigation regarding the formation of these bodies I came to the conclusion that they were formed by a chemical union of the soluble lime with the cell sap ripened to affinity with it, from which a formed material, no longer vital, is produced.

Mr. Harrington continues, "As the small globules accumulate more and more, growing at the expense of the cytoplasm, or causing the latter to fall away, large vacuoles appear in the cytoplasm, and, through these, lime-globules make their way into the gland cavities, probably often forced out of the cell by the mechanical contractions of the surrounding tissue."

Let me call attention to one point in Harrington's observations,—that he is not certain that the cyto-reticulum is used up in the formation of these bodies. He suggests that it may have fallen away. This is the idea that I get from my own investigations in regard to the formation of the globular bodies within the ameloblast. That is to say, the cyto-reticulum is used up when the globules appear. Although Mr. Harrington's cells are from different tissues than those of the enamel, yet note the analogy in the formation of these lime-globules.

Mr. Harrington continues, "There is very probably an organic matrix surrounding or permeating these small crystals when they are first formed, otherwise one cannot understand why they should be globular rather than rhomboidal in shape. Moreover, a residue is always left after acid treatment. Nearly all the cytoplasm in the cell is used up in the production of lime-globules. Coincident with the appearance of new nuclear elements from the wall of the blood-sinus or from the blood the constructive process starts up again, and there is a repetition of the lime-forming process."

It will be interesting to most histologists to note that Mr. Harrington found migrating nuclei from the blood enter the tissue to renew the continuous cycle of cell life when the old nucleus is used up. Evidence has led me to believe that the fibrous substructure which is to form the scaffolding around the enamel-globules may have its origin in elements which enter between the ameloblasts from the cells of the stratum intermedium, or from the connective tissue beyond, for in teasing the ameloblasts from the stratum intermedium these fibers seem to be attached to that tissue.

Harrington goes on to summarize: First are observed constructive processes of the cell, during which elements derived from the blood are built up into cytoplasm. Next these elements are transformed, and in them elements of the cytoplasmic reticulum give origin to lime-crystals. Then follows a gradual accumulation of globules inside the cell until the walls are broken and the lime-globules, with more or less attached cytoplasmic reticulum, are cast out into the gland cavities. With the rise of another cycle of secretion a younger generation of nuclei appear nearer the blood-sinus. Dilapidated nuclei, formerly active, can still be seen at the distal parts of the cell cytoplasm.

In this series of investigations Harrington found that the nucleus was used up and disappeared in the meshes of the cytoplasmic reticulum, while a new nucleus replaced it from the blood-sinus. I do not know how significant this fact is to us in studying the ameloblast, but I have certainly found the appearances of what seemed to be used-up nuclei within the substance of the ameloblast and never could account for their presence. We shall have to leave it to future investigation to prove whether the same process of nuclear degeneration and regeneration occurs within the ameloblast.

Harrington continues, "One might be tempted to regard the extremely thin layer of cytoplasm as a membrane through which lime in solution passes by osmosis directly from the blood, but no positive evidence whatever can be offered for the truth of this view; while we know that substances from the blood are first connected with the cytoplasm (either the reticulum or the cell-lymph) and appear as lime-globules only at the distal ends of the cell, after the cytoplasm has undergone considerable differentiation."

Stöhr goes so far as to state that gland-cells generally have their secretion appear first in the form of granules. But these calciferous glands form the product within the cell with absence of granular or thread-like stages in the normal production of lime, and with a disintegration of the nucleus during secretion after a definite and constant cycle of changes which is correlated with progressive changes in the cytoplasm and a replacement of the nucleus.

If the substance of the reticulum from which the lime comes was ever an integral part of the nucleus or in structural connection with it, it must have been during the constructive phase, when it was generated as cell protoplasm. There are never granules or threads of any kind discernible which arise from the nuclei. The nuclear and cytoplasmic structures resemble each other very closely in their exhausted condition. The disintegration of the cell during secretion is entirely consistent with two other characters which indicate that the lime-producing cells are very much specialized. These are: (1) that there is no membrane bounding their irregular contour, and (2) that the cells from which they have descended divide by amitosis.

I would here call your attention to the fact that the ameloblasts, by a peculiar metamorphosis, have become specialized epithelial cells without membrane at either end, and within them are elaborated the lime-globules which they give out to the calcifying surface in an altered form. They are rightly called the modelers or builders of the enamel, and the processes which are going on to form the lime-globules (calcospherites) within the ameloblast are very nearly identical with those described by Mr. Harrington.

Speaking of the migrating nuclei, Mr. Harrington says that these migrating nuclei appear as a rule closely compressed to the cytoplasm, either on the side of the sinus or that within the cytoplasm. After lengthening out they push their way into the glandular layer, where they become round. The thin layer of cytoplasm which has accompanied them gradually increases and expands about the center until it is finally merged into the general glandular tissue. They then become the typical nuclei, and eventually, with the cytoplasm, undergo the degeneration phases which have been described for this gland during the formation of lime.

I shall only be able in a paper of this nature to give a condensed description of the various changes which appear to have gone on within the substance of the cell plasma of the ameloblast. We can know very little about the conditions going on in the living plasma, since our methods of study necessarily kill the ameloblasts, and we must rest content with inferences drawn from appearances. The plasma of the nucleus and that of the cell body are mixtures of many complex substances, which undergo changes of a very complex chemical nature, differing widely in different cells. It is a question whether the cytologist of the future will ever be able to give us exact knowledge of the changes which take place within the ameloblast to form the enamel, we can only conjecture. In a general way we may assume that the nucleus of the ameloblast is concerned in the formation of new organic elements; in other words, that the cytoplasm of the body of the cell is a product of the nucleus. It is believed that this is brought about by the migration from the nucleus of minute elements, which by multiplication and growth build up the whole cytoplasmic substance. This cytoplasmic substance in the ameloblast is the seat of breaking-down processes, which occur with the formation of the globular bodies that are to form the enamel-rods. And we may assume that this metabolic action is going on continually in life during the formation of the enamel. In the dead sections under the microscope we see only that stage of growth shown when the microtome cuts the section. Another section, cut during a different stage of cell activity, would give appearances corresponding to the period of its life; there are also confusing post-mortem appearances which must not have existed in life. And I am satisfied that globular bodies seen in different parts of the section larger in diameter than the forming enamel-rod are post-mortem appearances. This necessarily acts to confuse the investigator in drawing his conclusions.

If we now examine tissue under the microscope showing the developing enamel as it begins to form, we shall see the mass of embryonic connective tissue above, and between it and the layer of ameloblasts the cells of the stratum intermedium; and seemingly to grow within this layer we find a rich network of capillaries. This is the blood-plexus from which the soluble lime is supplied. At this time the cells of the stratum intermedium are plainly to be observed forming a very marked layer between the ameloblasts and the capillaries. As the formation of enamel continues, this is almost entirely lost; then the blood-supply seems to rest very nearly against the open ends of the ameloblasts. The cells of the stratum intermedium at first must receive the lime in solution from the blood and pass it to the ameloblasts, but there is no evidence by microscopic observation of any change taking place within these cells. And it is merely a matter of conjecture whether or not they are the agents in selecting the lime from the blood during the whole process of enamel-building. In sections made where the enamel was nearly formed I have never been able to find any traces of this layer; it seemed to have merged entirely into the connective tissue, the blood-supply seeming to rest against the layer of ameloblasts. As I have said, these latter cells are the true enamel-builders, and the lime-globules (calcospherites) which are formed within their substance are, in my judgment, not part of the cytoplasm of the cell, but through its agency they are formed, and by reason of this formation the cytoplasm has disintegrated. The cytoplasm formed from the nucleus disintegrates in the formation of these globules, and this constructive and destructive metabolism is constantly going on within the cell. It is very evident that the cell sap plays an important part in the formation of these globules, it having grown to affinity with the soluble lime, producing an organic basis which has been changed by chemical metabolism into a formed material which, by further calcification, shall become a part of the calcified enamel-rod. Let us study the action as it appears under a Zeiss 2 mm. objective. We shall see within the cell minute, glistening, globular bodies, the first visible appearance of the formation of enamel which is an evidence of cell metabolism. These appearances are in the region of the nucleus, and much more numerous and larger below it, apparently having grown in much the same way that mineral crystals form in a strong organic solution. They seem to have merged together, forming larger and more irregular globules, some mulberry-shaped, many of them from six to eight times as those seen above. As they approach the end of the cell nearest the point where they are to calcify, they are arranged in a large globular mass nearly the width of the cell. In many of these masses the smaller globules apparently have merged into one another, or their outlines are lost within the cementing substance. The periphery seems to be clearly marked, and they are surrounded by a plasm which is the cementing substance. In an article entitled "Contributions Relating to the More Minute Structure of the Enamel," Dr. Otto Walkhoff concludes from his experiments that there is no cementing substance between the enamel-rods. His conclusions must have been made from investigations on calcified structures, rather than from the study of the developing enamel; for in studying the developing enamel the evidence of a cement-substance is positive. This cementing substance is a modified plasm of the ameloblast, and differs in degree only from the enamel-rod in calcifying in that it does not calcify in globular form.

Between the ameloblasts are seen the fibrous strings which act as a scaffolding between the rods. In most of my sections these are fibers without granular appearance. In some are seen minute globules, as though minute lime-crystals were clinging to the substance of the fiber. I have never seen this fibrous formation connected with the nuclei, nor have I seen strings of fibers formed within the central substance of the cytoplasm. They have always appeared at the periphery or between the ameloblasts. These globular bodies which have been formed within the cell, at the expense, as I believe, of the cytoplasm, are now ready to become segments of the enamel-rods, and at this point, by a further stage of the calcifying process, a substance is formed which is a transition tissue and is calcoglobulin. Some authors have doubted the existence of this tissue, but it must always be found where organic tissue calcifies. It is that substance sometimes called "borderland-tissue."

In conclusion, then, while undoubtedly in the early stages of enamel formation the soluble lime is passed from the blood-supply through the cells of the stratum intermedium—a structure which many authors consider a sort of connective tissue—into the ameloblasts, yet the visible morphological changes taking place during enamel formation are seen only in the ameloblast, where they appear in the central portion of the cell as minute, globular, glistening bodies, the result of a metabolic action. These bodies have been named calcospherites. As they progress toward the calcifying surface they merge together; not always losing their identity, but forming larger globular or mulberry-shaped masses, and at the point of calcification blend into a globular or block-shaped mass, nearly filling up the end of the cell. Sometimes the contents of these globules appear to be entirely merged into one mass, at other times to be a collection of calcospherites enveloped into the mass.

As these masses pass from the ameloblasts they are placed in a network of what appear to me to be fibers, having their origin apparently from the cells of the stratum intermedium. Possibly these fibers are a production of the peripheral cytoplasm of the ameloblasts. Around the scaffolding thus formed by the fibers a cytoplasmic exudate flows, and this is the cement-substance. Partial calcification then takes place along the line of the calcifying tissue, and we have between the fully calcified enamel and the globular bodies forming within the ameloblasts a layer of the transition tissue which is calcoglobulin. This is the substance which earlier investigators mistook for a membrane, and is analogous to the tissue which we find lining the dentinal canals and on the edge of all calcifying tissues. Calcification continues, and in this condition the rods are seen by mechanical contraction of the surrounding tissue to be forced inward against each other, undergoing a process of compression; and sections made at this time will still show globular bodies separate from one another, yet in continuous line. The semi-solid cement-substance is around and between them. If the young enamel should now be teased away from the layer of ameloblasts we should see the epithelial fibers standing out from the section, somewhat like the teeth of a comb. But these are covered with the cytoplasmic cement-substance, and it masks them somewhat; but they are too regular in their arrangement to be accidental formations caused by the pulling out of organic matter to form plasmic strings. The calcifying process continues in this manner, and enamel is formed. Enamel fully calcified contains little, if any, organic matter; the finest lenses do not reveal the slightest differences between enamel ground from a living tooth and that which has laid in the earth for centuries.

BRITTLE PLATINUM PINS IN PORCELAIN TEETH.

BY WILLIAM BOOTH PEARSALL, F.R.C.S., DUBLIN, IRELAND.

(Read before the International Dental Congress at Paris, August 9, 1900.)

I HAVE chosen this subject as being of deep interest to dentists in active practice, and also with a view of learning from members of my profession scattered throughout the globe if any of them have experienced this most vexatious defect in porcelain teeth. It is high time that we as a profession should take steps to control the production and sale of worthless materials; that we should know what we are using; why certain materials fail and are not to be depended upon.

No more mortifying mishap can take place in an honest dentist's practice than to have porcelain pin teeth "drop off" without the least cause, so far as the dentist can discover.

The pin teeth have been chosen, backed, soldered, and the backings polished with due care, and yet, without the least warning, one or more have "dropped off" in the patient's mouth. When the teeth that have "dropped off" are examined a crystalline condition of the fractured surfaces of the platinum pins will be observed close to the surface of the porcelain, and in some cases below it. This is invariable, although in some cases portions of the crystalline surface may have become rubbed before the porcelain tooth became detached.

I will not go into the history of such disasters, for they have been experienced by dentists in Great Britain and Ireland and the United States for the past forty years.

So far as I can ascertain, no effort had been made to ascertain the cause of this failure in the ductility of the platinum pins in such cases till I began an investigation in 1896, 1897, 1898. I kept all the defective teeth that had "dropped off" in my practice. All my specimens had been soldered with gold solder. I have experienced this defect in pin teeth at different times since 1884. In the spring of 1895 my friend Mr. G. M. P. Murray, F.R.C.S., sent me some plate teeth for examination, and asked my opinion as to the cause of the fracture of the platinum pins of some teeth that had been recently soldered.

Examination of the backs of the porcelain teeth showed the same crystalline fracture close to the porcelain such as I had observed in the cases before mentioned.

When I met Mr. Murray and talked over the matter I found that his experience was the same as my own.

The teeth had "dropped off" as spontaneously and fortuitously as if Sir Isaac Newton himself was in waiting for an example of the law of gravitation after the apple tree had done its object-lesson. I set to work to collect examples of teeth that had "dropped off," and I soon found that the "accident" was even more frequent among teeth used with vulcanite attachments than when the porcelain teeth had been heated and soldered.

This defect is met with in teeth manufactured by British and American firms.

I have in my possession a continuous-gum canine, the pin of which snapped off when I was pushing it into a wax card in summer weather. The tooth has never been used for any dental purpose, and it is in the state in which it came from the manufacturers to my hands. I brought this defect in platinum pins before my professional brethren in Dublin in 1896, and so interested was the meeting in the matter that I was requested to place the scientific part of the investigation in the hands of Professor W. N. Hartley, F.R.S., of the Royal College of Science, Dublin.

Professor A. J. Scott, of the Royal College of Surgeons in Ireland, made photo-micrographs of well-selected examples of the fractured surfaces.

I communicated with a large firm trading in the precious metals, with a view of learning the cause of the brittle pins. They wanted a large fee for the investigation, and also an amount of the affected platinum I could not gather in the course of years.

Professor Hartley has devoted many years to spectroscopic work, and has all the necessary apparatus for photographing the spectra of metals when used in minute quantities and volatilized by the electric spark or by the oxyhydrogen jet. Professor Hartley's investigation is new to science, and this minute and accurate physical examination should teach platinum refiners the fact that this defect *can be avoided* on their part as well as by teeth manufacturers.

I have had a large correspondence with dentists and manufacturers. The correspondence shows that the defect is of frequent occurrence; that it has been known for over forty years; that remonstrance is of no effect with the manufacturers when brought before them by an individual; that the defect cannot be ascertained by the dentist beforehand, and last, but not least, the manufacturers are absolutely ignorant as to the cause of the brittleness, for they know nothing of science or its teachings.

The following causes have been suggested for the "dropping off" of pin teeth: Riveting, investments contaminated with base metals, overheating the teeth during soldering, impure solder, rapid expansion and contraction in investment, soldering with a smoky flame.

The following impurities in platinum have also been put forward: Phosphorus, phosphoric acid, zinc, carbon, iridium, arsenic, fluoric acid, hydrogen.

Riveting.—Now no one can for a moment regard this operation as a cause of brittle pins for two reasons: one that pins are not always riveted, and, second, brittle platinum could no more be riveted than brittle steel or brittle copper. I am prepared to state that in the large majority of examples I have examined the pins have *not* been riveted.

Investments Contaminated with Base Metals.—Experiments were made with investments deliberately mixed with filings of zinc and lead, but the platinum pins did not suffer after the investment was brought to a bright red heat and soldered.

Overheating during Soldering.—In the course of many years I have seen a few teeth backs melted or sweated off porcelain teeth when soldering with a deflected flame in confined positions, but I have never seen the pins spoiled from this cause. As a matter of fact, porcelain teeth in investments are rarely overheated during soldering.

Impure Solder.—I am of opinion that such impurities do not exist, for if the solder is purchased it is supplied by firms who always boast that they only supply the best articles, and, one would naturally suppose, could have no possible interest in selling a bad article. If solder is made by the dentist in his workroom only reliable material is used, for the simple reason that the dentist saves himself labor and trouble by using a reliable solder.

Cadmium Solder.—I have used this solder for several years. Dr. W. A. Hunt, of Yeovil, and Mr. Goodman, of Taunton, have used it for several years. These gentlemen, strange to say, have never met with brittle platinum pins, and I have had no experience of this defect since I have used cadmium solder.

Rapid Expansion and Contraction in Investment.—Porcelain teeth may be cracked or broken from carelessness in rapidly heating or cooling, but I have not seen the pins break.

Soldering with a Smoky Flame.—This cause cannot be seriously considered, as few dentists waste their breath in heating investments with a blow-pipe, and a smoky flame is not hot enough to make solder melt and run rapidly.

Mr. G. M. P. Murray carried out the following experiments. He selected fourteen plate teeth that had been in use in the mouth for over ten years, and may be assumed to have tough platinum pins. Nine were American teeth backed with gold, and five were English teeth with dental alloy backs. All these teeth had also been riveted:

Experiment No. 1. With a knife and hammer an attempt was made to split off an English tooth from its backing. Result—the porcelain broke away, leaving the pins intact in the backing.

Experiment No. 2. An American tooth treated in the same way. Result—same as No. 1 experiment.

Experiment No. 3. An American tooth was again treated in the same way. Result—the same, although it took considerable force to split the tooth away. One of the pins in the backing was broken with pliers. The fracture was fibrous.

These experiments were designed to test the toughness of the pins in the teeth used for experiment.

Experiment No. 4. An American tooth was invested in sand and plaster, dried, and heated with the blow-pipe till the backing was fused. The backing was split off with knife and hammer. Result—the pins were so soft that the knife-edge cut deeply into them; one pin broke through the uncut portion with a *fibrous fracture,* the other coming away with the backing. This latter pin when broken with the pliers showed a *fibrous* fracture.

Experiment No. 5. An American tooth was used as in experiment No. 4. Result—the platinum pins remained intact in the backing; one pin, on being broken with the pliers, showed the fibrous fracture.

Experiment No. 6. An English tooth invested in plaster and sand mixed with filings of lead and zinc. It was heated and soldered, and afterward, when cool, split off the backing with knife and hammer. Result—very difficult to split off. Pins remained in the backing, the porcelain alone breaking away. One pin, being broken with pliers, shows a fibrous fracture.

Experiment No. 7 was a repetition of No. 6, with the same result.

Experiment No. 8. An American tooth was invested in sand and plaster mixed with lead and zinc filings. The heat was raised till the backing was fused. The latter was afterward split off as in other cases. Result—the knife nearly severed the pins, and the fracture of the uncut portion of the platinum pins was fibrous.

Experiment No. 9. An English tooth was invested in plaster and sand. The investment was heated and soldered with a smoky flame. The backing was afterward split off as in other experiments. Result—the pins were cut through by the knife-edge.

Experiment No. 10. An English tooth treated as in experiment No. 9. Result—one pin broke with a fibrous fracture; the other remained uninjured in the backing.

Experiment No. 11. An American tooth was invested with zinc and lead filings mixed in the plaster. The investment was heated with a smoky flame till the backing was fused. The backing was split off as before. Result—one pin nearly cut through; the fracture through the remaining portion was fibrous. The other pin remained in the backing.

Experiment No. 12. An American tooth was invested in plaster and sand. The investment was heated and soldered with a smoky flame, and the backing split off as in other experiments. Result—the pins remained uninjured in backing.

Experiment No. 13 was a repetition of experiment No. 12. Result—the pins were found to be very soft, and were nearly cut through.

Experiment No. 14 was a repetition of experiment No. 12. Result—the pins remained in the backing. One pin was broken with pliers, and showed a fibrous fracture.

These experiments showed that "overheating," "riveting," "impurities in the investment," or "the use of a smoky flame in soldering" do not cause platinum pins to become brittle, and to show the crystalline fracture of the pins of the porcelain teeth that "drop off."

Other Experiments.—Four unused American porcelain, pin teeth were taken, the remainder of a set of six. Of the two teeth that were used in practice one had "dropped off" after a few days' wear, the other has been in use a year.

Experiment No. 15. The pins of three of these teeth were broken with pliers; all the fractures were fibrous.

I need not go into the nature of the chemical impurities on the list which have been put forward as a stalking-horse by the teeth manufacturers as a cause for brittle platinum. The report drawn up by Professor Hartley, dealing with such chemical impurities by an original and exhaustive physical examination with the aid of the spectroscope, will show that *carbon* is the cause of this brittleness.

In some experiments Mr. Murray made with me we were able to melt brittle platinum pins with the aid of the oxyhydrogen jet on some chalk, and the button of platinum formed with little difficulty.

The button was rolled into a ribbon of what proved to be soft platinum without any brittle characteristics.

Mr. Mitchell, of Dewsbury (England), has, however, come to our assistance in this matter in an unexpected way. He had made many electric furnaces, and he noticed in cases where he did not bake the clay of the furnace before turning on the electric current that the furnace failed very quickly. On taking the furnace apart to discover this cause of failure he invariably found that the platinum wire in the furnace had become quite brittle; so brittle as to be quite easily broken in the fingers.

The cause is a simple one. The platinum wire is wound with cotton before it is coiled and bedded in the fire-clay of the furnace. The object of winding the platinum wire with the cotton is to leave a space between the wire and the fire-clay to allow for the expansion and contraction of the wire in heating and cooling as the electric current is turned on or off.

When the current is turned on in a newly made or unbaked furnace the cotton is transformed into carbon by the heat, and it combines with the platinum at the high temperature and makes it quite brittle.

This experiment has been made by Mr. Mitchell many times with the same result. The fractured ends of the platinum wire treated in this way show the characteristic crystalline fracture I have endeavored to call attention to.

Were we intimately acquainted with the process of making porcelain pin teeth, I have no doubt some detail of the manufacture would account for the occurrence of this most serious defect.

I have had a correspondence with manufacturers, having sent them examples of brittle platinum pins. The correspondence is amusing to me, as there is such a lack of candor and intelligence of mind on the part of the manufacturers of teeth. In no single instance have I been able to get them to see that they are not only absolutely wrong in their conclusions, but that they are ignorant of all scientific knowledge of the metal platinum. They buy this metal from reliable refiners, but no physical tests or examinations of the platinum are made, and there the matter ends. The dentist has to bear the opprobrium of the defect.

One gentleman laid great stress upon what he was pleased to call "undue strain" in some specimens of teeth used with vulcanite attachments. The teeth had not broken, although they had left the vulcanite, and I therefore put aside this cause as one of any weight in the investigation.

He also quoted the opinions of mechanical dentists of considerable experience. I never could get him to give me the names of these experts, so that I could communicate with them; and it was rather groping in the dark to be confronted with the opinions of unknown individuals.

Now I found that I could crush modern porcelain teeth with ease with pliers used by the hand. The porcelain teeth made thirty, forty, and fifty years ago have to be broken with a hammer on an anvil.

"Overheating" was also used as a stalking horse. When I asked my correspondent how overheating could take place in a vulcanizer worked at a temperature of 168° C., and contrasted this temperature with the melting points of fine silver, 1032° C.; fine gold, 1102° C.; platinum, 2534° C., he could not give any answer.

My correspondent then challenged me to send him twelve teeth used in vulcanite work with brittle pins with the crystalline fracture. I sent my correspondent more than a dozen teeth with pins showing a crystalline fracture, teeth *of his own manufacture.*

He had previously expressed the opinion that "the working and not the metal is what we say the dentists should pay attention to." Of course not; we should never investigate any defect in platinum.

I then asked this learned and scientific correspondent the following question: "Can the frequent occurrence of this defect be due to the fact that platinum refiners do not now weld spongy platinum, but melt spongy and old platinum scraps together under the electric arc or by the lime or oxyhydrogen jet?"

My correspondent never replied to me as to the particulars of the preparation of platinum in the smelter's hands, so that I have been unable to learn whether the welding or the melting process is practiced most frequently. I have received particulars of porcelain teeth that have "dropped off" from London, Dublin, Edinburgh, Bristol, Leeds, Gloucester, Great Malvern, Bournemouth, Tunbridge Wells, York, Wexford, Ramsgate, Luton in Bedfordshire, and from Copenhagen in Sweden. And I was told in the United States of America that it was common there, and I am sure many instances pass notice from lack of observation and the way the manufacturers have baffled all inquiries on the part of individuals.

Collectively we ought to be able to put suitable pressure on the manufacturers, who are so keenly interested in having things to sell on which they can make large profits without any regard to the reputations of the men who have to use porcelain teeth, and on whom the brunt of the displeasure naturally shown by the patient falls.

NOTE ON THE METHOD OF INVESTIGATING THE COMPOSITION OF THE PINS OF BRITTLE AND TOUGH PLATINUM AND THEIR COMPARISON WITH PURE PLATINUM AND IRIDIUM.

BY WILLIAM NOEL HARTLEY, F.R.S.,

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"For the minute chemical analysis of mineral substances, where the quantities of the substance dealt with are so small as to be beyond the skill of the chemist to separate and weigh them separately, it has been found advantageous to employ spectrum analysis, aided by photography. Generally speaking, a photographed spectrum is a chemical reaction distributed in time and space. It is, in fact, a series of as many observations as there are lines in the *spectrum* photographed, for every line has its meaning. The length and strength of the lines is an indication of the quantity of material to which the lines belong, and which is present in the flame or spark used to vaporize the substance; and it also indicates the proportion of the substance present in the material examined. In this manner, or, more correctly speaking, by carrying out this principle, ancient coins and jewelry have been quantitatively analyzed without submitting them to injury."—*Transactions of the Chemical Society.*

The method in this case of the platinum pins consisted in passing between their points a rapid succession of powerful electric sparks, condensing the rays on the slit of a spectroscope and photographing the spectra obtained.

The pieces of metal were only one-twenty-fifth of an inch in length, and peculiar difficulties were thereby encountered. It is necessary that the screw pincers which hold the points be good conductors of electricity, and they are, as a rule, made of steel.

The sparks were found to pass from the steel as well as from the platinum, although their passage was not actually visible; nevertheless sufficient iron was volatilized with platinum to vitiate the results of many experiments. To obviate this various devices were resorted to, and that finally and successfully employed was to fuse onto the platinum pins a wire of pure gold.

The electricity passed through the gold wires gave a succession of sparks, in which the material of the platinum pins was vaporized, along with a very small quantity of gold from the wire conductors. The lines of gold are known, and on observing the spectra they were easily picked out. On comparing the brittle platinum with the spectrum of pure platinum, it was seen that the spectra were line for line the same, except at one portion; and for the better to compare the two the plates were enlarged and prints taken from them just at the region where they seemed to differ.

The results of the examination are shown by the notes made on the prints. Previous to this the plates were carefully examined for the lines of metal likely to cause a deterioration in platinum, and their absence was proved.

Since then I have examined the spectra for silicon, which element it was thought might be present, but I have not found any indications of it.

Both iridium and iron are difficult to separate entirely from platinum, and on this account I looked particularly for their presence in any appreciable quantity, without success. I may add that palladium, rhodium, arsenicum, and ruthenium were also sought for, but were found to be absent.

A good deal of trouble was occasioned by two lines which were remarked in the spectrum of brittle platinum, tough platinum, pure platinum and iron, being close to two silver lines.

The wave lengths of these lines are in the dark spectrum:

	I.	II.
Of iron (Liveing and Dewar)........................	2625.2	2627.9
Of platinum (Exner and Haschek)....................	2625.41	1628.13
Of silver (Hartley and Adeney).....................	2625.2	2627.3

At first it appeared as if there was some impurity common to the different specimens of iron and platinum, the nature of which had not been ascertained, but these lines have now been proved to be really components of respective spectra.

I append a note of the various publications in which the methods of examination here put into practice are described, since they have not yet passed into common use among chemists and metallurgists, though accepted and acknowledged by the best authorities. They date back to 1879.

Hartley and Huntington, "Philosophical Transactions of the Royal Society," vol. clxx, p. 257.

Hartley, "Description of Instruments and Processes employed in Photographing Ultra-Violet Spectra," Scientific Proceedings of the Royal Dublin Society, new series, vol. iii, p. 93, 1881.

Hartley, "Researches on Spectrum Photography in Relation to New Methods of Quantitative Chemical Analysis," Philosophical Transactions of the Royal Society, vol. clxxv, pp. 49-325, 1884.

Hartley, "Notes on Certain Photography of the Ultra-Violet Spectra of Elementary Substances," Transactions of the Chemical Society, vol. xli, p. 84, 1882; and Hartley and Adeney, "Measurements of the Wave-Lengths of Rays of High Refrangibility in the Spectra of Twenty-one Elementary Substances," Philosophical Transactions, vol. cxcv, p. 63, 1884.

Hartley, "Photography and the Spectroscope in their Applications to Chemical Analysis," *Journal of the Society of Arts,* vol. xxxiv, p. 396, 1886.

The medal of the society was awarded for this last paper, which was merely an abstract of those previously published with demonstrations of the method of working.

"Spectrum Analysis, Practical Applications of." The article in "Thorpe's Dictionary of Applied Chemistry" (p. 536), published by Longmans, is from my pen. It contains a very brief account of my methods of working.

Report on Brittle Platinum.

BY WILLIAM NOEL HARTLEY, F.R.S.,

PROFESSOR OF CHEMISTRY, ROYAL COLLEGE OF SCIENCE, DUBLIN, IRELAND.

I received from Mr. W. Booth Pearsall, F.R.C.S., on May 23, 1898, a small packet containing ten pin points of brittle platinum wire which had been in use for dental purposes, with a similar number of points in another packet labeled "tough platinum." I was requested to examine the brittle platinum for impurities of a metallic nature supposed to be present. The quantity of defective material placed at my disposal was small, as may be judged from the fact that the largest fragment of wire was only one-twenty-fifth of an inch in length. As eight of these had a total weight of 0.1819 gram, it may be concluded that the whole of them did not weigh more than 0.2274 gram. I was informed that they had been examined microscopically, and found to possess a crystalline structure. I ascertained this fact independently. The pins broke readily on bending, and though they did not break under the hammer, the flattened wires had ragged edges, which shows an imperfect malleability. It was my desire if possible to examine each fragment separately, as they might differ somewhat in composition.

The very small quantity of material available would render any attempt at ordinary methods of analysis by separating the constituent substances entirely futile, even if the whole were employed in a single analysis. It was decided to rely upon spectroscopic methods, but considerable difficulties were encountered in operating on fragments of metal of such very small dimensions. Between thirty and forty photographs of spectra were obtained and carefully examined; many of these were in parts greatly enlarged, some of them to ten diameters.

It was proved beyond doubt that the following metals are most certainly completely absent,—namely, zinc, cadmium, copper, silver, mercury, tin, lead, arsenic, antimony, bismuth, tellurium, nickel, cobalt, aluminum, gold, chromium, and also the metals which would scarcely be expected to be found in platinum,—namely, iridium and thallium.

A very careful examination was made for iron, as this element is difficult to remove entirely from platinum. For this purpose a spectrum of pure iron and one of the purest platinum which perhaps has ever been prepared were photographed. It was found that the pure platinum electrodes gave spectra identical, line for line, with the spectrum of two fragments of brittle platinum. I conclude, therefore, that any metallic impurity in this platinum must be in such a very minute proportion that it is impossible for it to cause the brittleness.

The comparison of the platinum spectrum with that of iridium showed that the strong lines of the latter element were absent from the platinum spectrum.

There remain now certain non-metallic elements, such as phosphorus and carbon, and metalloids, such as tellurium and arsenic, all of which can cause brittleness in platinum; but the two latter have been proved to be absent from these specimens. Phosphorus has been added to native iridio-platinum in the United States for the purpose of rendering it fusible. It is said that the phosphorus is entirely eliminated from the iridio-platinum alloy by continued heating. There appears to be nothing more than a very minute trace of iridium in the metal, and the brittleness is not caused by that, because, if it were, melting would not improve its malleability; proof of this occurs later.

It is, however, very probable that phosphorus may be present, and, as the effect of phosphorus in minute proportions is to render platinum brittle and crystalline, the properties seen in the pins, taking this view of the matter, is quite what might be expected. Phosphorus would not be detected by the method of spectrum analysis, and it is extremely doubtful if any chemical method of separation would satisfactorily afford proof of its presence when so small a quantity is available for analysis.

Carbon also renders platinum brittle. The platinum cones or caps used in the ignition of the mixture of gas and air, or petroleum vapor, which is used in gas and oil engines, become so brittle that they may be broken up between the fingers.

I am of the opinion that some non-metallic impurity, either carbon or phosphorus, is the cause of the brittle and crystalline character of this platinum, either of which substances might be introduced in the working up of old platinum.

Both phosphorus and carbon can be eliminated by prolonged fusion of the platinum under the oxyhydrogen blow-pipe flame; accordingly I fused the remainder of the fusible pins, and find that the metal is now greatly improved in malleability, which is a strong confirmation of my opinion.

DENTAL EDUCATION.

BY L. ASHLEY FAUGHT, D.D.S., PHILADELPHIA, PA.

(Read before the National Dental Association, July 10, 1900.)

THE subject of dental education to-day presents for consideration three separate and distinct lines of thought. The character of the mental training and educational attainment which should precede the entrance upon dental collegiate study; the curriculum to be presented to the individual student during the period of attendance at dental college; and that effort to be devoted by the profession to lift the general public to an educational plane which shall fit it to comprehend dentistry as a learned profession, and to appreciate the ministrations of a truly educated dentist.

Any one who takes the pains to review carefully all the published literature on dental education since the first article appeared in print will receive the impression that the profession has at no time been a stranger to the importance of each of these topics; but the reviewer will be convinced that a marked degree of progress has been effected only in relation to the second one,—the nature of the curriculum at dental college. The advance accomplished in this direction is everything that can be desired. Educational facilities which began years ago in severe simplicity, sufficient for their day, have steadily increased and broadened, by carefully engrafted additions, until we have to-day a system of collegiate dental training which gives to the student an opportunity to acquire a knowledge which is fully commensurate with every possible demand which an exacting public may make upon him in his professional life. This attainment is a thing in which each member of the profession should take an honest pride, for it has not been accomplished easily. The men who have made such things possible have done it at great personal sacrifice and against untold obstacles, and, thanks to their efforts, we have to-day an educational system in dentistry second to none of the learned professions.

As to the possibilities of further progress in this department, your essayist would direct your thoughts by quoting the words of that earnest teacher, Professor George Barker, which, although written twenty-seven years ago, seem to await to-day as the fitting time for action upon them. He said in 1873, "If I am asked what in my judgment would best advance the interests of dental education, I would answer, reorganize and consolidate the existing dental colleges with faculties selected from the best dental teachers in the land, so situated that they would be convenient to large sections of country and not liable to react upon each other; with uniform fees for attendance and graduation, and such endowment that the greater portion of time of the teachers could be devoted to preparation and delivery of carefully prepared lectures."

This to-day is a consummation devoutly to be wished, but the difficulty of the establishment of the endowment funds stands as the first barrier to be swept away. Every consideration points to the fact that those capable of creating endowment funds for any educational purpose seek the channels of the great universities. They do not give to an individual or to separated institutions, because individuals and such institutions possess no guarantee of permanence or of unselfish interests. These donors seek, above everything, surety of permanence, and full assurance that the trust will be administered for the purpose for which alone it was created. Great universities which have already stood the test of time, enduring above and beyond the lives of any individuals, passing in their ministrations from age to age, around which endowment funds for one purpose and another have and are gathering, alone can promise the field they seek. The indication, therefore, is that those having the best interests of the dental profession at heart should gather their thoughts, their sentiments, and their devotion around the dental departments in these universities, making them stand out pre-eminently as the representatives of the profession. Desire and power to create may thus best meet, and, as to the other institutions, the survival of the fittest would be but a question of time; but these would surely become endowed.

Before passing from the consideration of dental education as administered within college walls, your essayist wishes to express two or three minor points which have obtruded themselves prominently upon his notice. There seems to be a necessity for the development and conservation of the professional idea. If we are to have men in the profession in the future imbued with true professional character and fitted with professional enthusiasm, the seed should be sown during college life. The establishment of chairs to teach dental ethics and dental history is the need of the hour. Careful instruction on these subjects from the lecture stand through the three years of collegiate student life as a course, given the same prominence and made a requirement, as are the other subjects taught, would not fail to develop a better professional grade in the practitioner of the future. Students who have to stand examination on this subject, the markings for which count in their average for advancement or for graduation, will not fail to acquire, and to carry a large part of their acquirement into their future professional life.

The subject of ethics is of vital importance, and needs no argument to convince you that many of the flagrant transgressions apparent in the professional life of to-day are a failure of the head rather than of the heart. They do no better than they know, and many willingly do better when they do know. Why not so teach them as to save them from themselves? The subject is very broad, and when properly considered would point out pitfalls into which the unwary too often come.

As to dental history, inquire of the younger men in the profession and see how meager is the information. Is it natural to have strong ties of family pride and affection when the strings which bind one do not dip deeply into the past? How many of the young practitioners of to-day are familiar with the literature of the profession issued during their term at college? The number is not large, and still less the number of those familiar with it for five years preceding the date of their matriculation; and very few there be who would claim an intimate knowledge dating back to 1840. Let an effort now be made which shall not be dependent upon the personal inclination of the proposed novitiate, but which shall by its own requirement compel a knowledge of the past sufficient at least to become a bond with the present of its possessor not easily broken. Surely from such union must flow to the public a better type of professional spirit.

The weak spot in dental education as administered in dental colleges to-day lies in the department of the demonstrators. What is generally supposed to be a point of strength is, from the standpoint of the student, quite generally claimed not to be effective. Careful inquiry shows that the students would much prefer, and would feel better instructed, if one or two demonstrators in each of the departments of operative and prosthetic dentistry would devote all their time in the institution. The present system so much in vogue, of having a number, each coming to take charge for an hour or so in rotation, is deprecated as exceedingly faulty and unsatisfactory. A change in the manner of examining is also suggested. The average student does not begin to study until the time of the term examinations is at hand. He loafs on his study until this necessity comes as a spur to his lagging. If a system of examination at intervals through the term could be inaugurated the habit of study would be made continuous, and the amount of actual knowledge acquired would be greatly increased. Of course, the markings for these examinations would have to count in making up the term average for advancement or for graduation.

Regarding the dental educational entrance requirement, the profession seems ever to have had it under consideration; that is, to have recognized in a general way that education was a desirable factor. And while the requirement outlined for to-day is not for a moment to be compared with the indefinite ones in the chaotic period reaching from the inception of the profession up to about 1890, still the material obtained through its application is far from satisfactory. Indeed, it is a question whether those entering upon the study of dentistry in 1870 were not better fitted to take up the course of study then given than are the students now admitted to take the present course. This perhaps is in part due to the fact that those presenting formerly were usually men of mature years, who had had the time in adding years of life in contact with the world to correct in a measure the deficiencies of early life, whereas the applicants of to-day are for the most part drawn from the youth of the country, filled with an overweening desire to enter a channel of life which they have led themselves to conceive of as leading to riches. It is not to be denied that "haste to be rich" and the lack of apparent *pay* in scientific education are gross obstacles to the laying of a proper foundation upon which to rear the structure of an educated professional life.

It has not been generally recognized by those who hold back the establishment of an entrance requirement which shall be the equivalent of a diploma of an approved high school having a three years' course that the great increase in the breadth of curriculum presented to-day in dental colleges demands that those entering upon the study should have nothing less than is outlined by this requirement as a preparatory equipment. The steady increase in curriculum demands a high and definite *qualitative* educational entrance requirement. While the dental educators have appreciated the necessity for this increased curriculum, they have not all in the same degree recognized the embargo which they themselves have thus morally laid upon themselves not to admit to it those improperly qualified.

The young student of to-day comes seriously handicapped by the lack of that which springs from the *qualitative* factor,—the ability to acquire knowledge through individual effort. He seems not to know how to study. He sits in front of the professors with the apparent idea that his duty is accomplished in presenting himself, and that their duty is to in some way put a funnel into his brain and pour into it information, as it were, by the bucketful. The ability to apprehend, digest, and assimilate, and the springs of personal action necessary to these ends, seem too often utterly absent. The demand is now more than ever for attention on the part of educators to this *qualitative* factor.

While the idea may savor of the Utopian, and may, like that of Professor Barker's, have to wait some years for its fruition, still your essayist can but believe that in the working out of the strictly *qualitative* factor in the present era improvement in material would result if it were possible to have a school established to give a special preparatory course, the certificate of which school should be an essential to matriculation in *any* dental college.

It now remains but to consider briefly that aspect of dental education which relates to the general public. This your essayist considers is not being rapidly accomplished. What is being done is not by the most desirable agency. It is the non-professional which is creating the public idea of dentistry. When the mass think of dentistry, is not the exponent of their thought the advertised dental parlor? The synonym surely is not "oral surgery,—medical training with special reference to the oral cavity,"—as it should be.

Is it not true that dentistry stands to-day at the parting of the ways? So rapid has been the progress made by the profession that we are very much inclined to think that it is yet in its infancy, and that much remains for future development; when perhaps the truth is that we have actually passed and realized in the fullest maturity the very fondest expectations and ideals of our forefathers. Indeed, the present status and prestige of scientific dentistry, to say nothing of an ability to render a service fraught with such beautiful results, release from pain, and usefulness, was never even dreamed of in their imaginings.

The impression with the best exponents is growing daily that dentistry in its truly scientific comprehension cannot now continue in further development as from the parent stock, but rather that from now on the parent stock will decline, grow less professional, more commercial, and the services of the future which it renders will have engrafted upon them every stamp of limitation of which it is possible to conceive. In other words, is it not now desirable that from the parent stock should emerge an offshoot which shall be obliged to cut out for itself a position in scientific healing that shall lift those engaged in it, and in turn be lifted by them, to a relationship in the care of that region of anatomy embraced in the oral cavity never contemplated by our forefathers, but the services of which shall be sought, by those requiring them, with the bearing and full appreciation as come the sufferers seeking relief at the hands of other medical specialists? This deviation should from now on be a distinctly marked one, differentiated in every respect from what we have in the past considered to be dentistry. It shall embrace considerable of the mechanical, but very much more of the medical. It shall be followed by those who have the capability to keep away from the rabble and from the uneducated. It shall be very largely, if not absolutely, as free from pain-giving in its ministrations as is surgery conducted under the medical auspices. It shall have nothing to do with the constructing of artificial dentures or other mechanical appliances, but shall dictate when they are needed, direct how they shall be constructed and worn, etc., but delegate the actual construction to a class of artisans who shall do for the adviser just as the manufacturer of surgical supplies does for the surgeon or the optician for the oculist.

It is not to be understood by this statement that practical knowledge of the mechanical is discouraged or deprecated, for, on the contrary, he who cannot go into the prosthetic laboratory and readily accomplish anything pertaining to this line of service is seriously deficient in the brain development and finger skill necessary to thorough service in any other department of dentistry. He cannot be fitted to direct and dictate.

Rest assured, however, the day is coming, indeed, it is now at hand, when those who practice what is comprehended in the fullest meaning of the definition quoted must be separated from those who practice dentistry in any manner related to the present ideas of the public by every line of demarkation, even greater than that which now separates the oculist and the optician. The men capable of higher things must in the very near future cut loose and go before the public as practitioners of a healing art capable of rendering to suffering humanity services along the lines indicated, in large measure leaving dentistry as understood by our forefathers, as it has from them developed, to the hands of those who are capable of nothing else. Your essayist has always been one of those who felt that these high ideals should be engrafted upon dentistry, and that they must necessarily in time be its expanding and enlargement. But he is now firmly convinced that the time has come when this cannot be, for those who are capable or those who follow this form of practice are, as compared with the hordes who desire and follow the other, commercial dentistry, so in the minority as to call for a stepping aside of the more professional and scientific into a band by themselves; that discrimination shall be forced, and those who want "cheap John" dentistry must go to those who give it, and those who want scientific treatment of their mouths must come with the understanding that they want it and to those who only are capable of giving it. This is along the lines by which a public not appreciating an oculist go direct to the optician, while those who value the eyes seek the oculist.

PERICEMENTAL ABSCESS.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

(Read before the Dental Society of the State of New York, May 9, 1900.)

In a moment of temporary forgetfulness I promised one of your officers some time ago that I would come before you at one of your meetings with a paper. I have begged to be excused simply because it seemed to me impossible to adequately fulfill my promise, but I was not permitted to escape. So now I have come to offer you the best I can do under the circumstances, and that is simply to give you an account of some of the more recent studies of pericemental abscess that I have made, and talk about it rather than give you a formal essay on the subject.

I take it for granted that we all know what a pericemental abscess is;—that peculiar condition which, so far as I know, was first described by Dr. Darby, about 1879 or 1880, as an abscess upon a tooth with a living pulp.

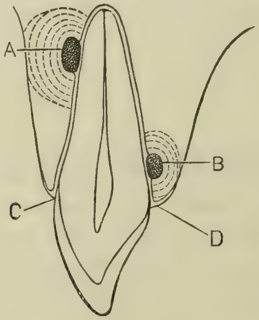
Since that case was reported numbers of other instances have occurred where men in society meetings have alluded to their experience of having drilled into the pulp-chamber and found a perfectly normal pulp. They have been surprised to find the apparently anomalous condition of a suppurative inflammation existing upon these teeth with vital pulps.

We have adequately explained the manner in which infection of the apical region takes place *via* the pulp-canal through putrefactive decomposition of the organic material filling the pulp-chamber, but when we come to explain the suppurative conditions upon these teeth, in which there seems to be no break in the gingival attachment, and in which there is certainly no break in the tooth-walls, then the problem becomes much more complex. I wish to direct your attention this evening to the result of some studies along this line.

After having met with one of these cases of what has been called pericemental abscess, I kept my eye open for similar appearances, and in the course of a few years I have made notes of fifteen or twenty of such cases that I have studied with considerable care. I have found them associated either with cases of existing pyorrhea alveolaris, or else I have found them in the mouths of individuals in whom the whole system was in that debilitated state generally preceding pyorrhea alveolaris. I have come to recognize pericemental abscess as associated with a systemic condition which is predisposed to pyorrhea of the malnutritional type.

These localized suppurations have been so constantly in association with pyorrhea alveolaris that I have come to regard pericemental abscess as the typical lesion of pyorrhea alveolaris, and perhaps I can demonstrate what I regard as the connection between the two by a rough drawing. (Fig. 1.)

FIG. 1.



In all necrotic processes in which pus is one of the by-products it seeks an outlet upon the surface. We know that it is a law of pathology that pus in a tissue seeks an outlet along the line of least resistance. We will consider a tooth located in its socket after that manner somewhat (Fig. 1), with one of these areas of necrotic inflammation well toward the root-apex upon the pericementum. The abscess gradually enlarges until it breaks at that point (A). Clinically it is peculiar, and relatively rare.

Let us suppose that the initial focus of inflammation begins at an area near the gingivus (B), and enlarges until the line of least resistance for the exodus of pus is at that point (D).

I have no doubt that any practitioner who ran across a case of that sort, passing a probe in at the point D, finding an area which apparently indicated denuded cementum to that depth, would say it was pyorrhea alveolaris. It is a very simple case,—a pocket in the pericementum exuding pus; it is certainly a pyorrhea, and is a commonly observed condition.

I have seen many of these pericemental abscesses, and have seen them break in both of the ways described. I have seen in the same tooth upon one side a pericemental abscess form and discharge its contents upon the free surface of the gum without a break in the gingivus, and upon the other side I have seen the abscess form nearer the gingivus and break at its cervical attachment.

If the only difference, then, between these two conditions is the method of exit of the pus, then pathologically they are the same thing, whatever we may call them clinically; we cannot make a distinction in the pathological processes based upon the direction of pus exit. They are therefore, in my judgment, both the same process. It is manifestly illogical to classify this condition as two different diseases when the clinical differences are the only ones which separate them. The pathology and etiology of the abscess shown in the diagram are the same whether the pus exit takes places at A or at C. If it take place at C we call it pyorrhea alveolaris, for it is an alveolar pocket exuding pus. It is the accident of location which determines the point of pus exit, and which is merely a clinical variation of a single disease process. Do not understand me as asserting that these conditions explain all the cases of pyorrhea alveolaris that come under our observation. I do contend, however, that this pericemental abscess is the typical lesion of a certain well-marked and common form of malnutritional pyorrhea alveolaris.

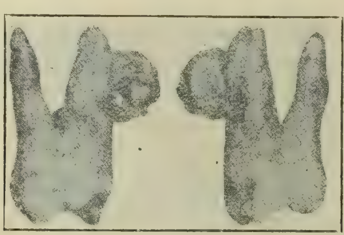
Having reasoned to that point, it occurred to me that if we could discover the exciting cause of this lesion,—if we could, by bacteriological and histological investigation, detect the cause of pericemental abscess,—we would be well on the way toward explaining the etiology of one of the forms of pyorrhea alveolaris.

An interesting and important feature of pericemental abscess in this connection is the circumscribed character of the lesion, representing as it does an infection by an organism which has found its way to a point of diminished vital resistance in the pericemental membrane either through the tissue or blood-current. The localized and deep-seated character of the suppurative process enables us to secure specimens of the infecting organism contained in the central portions of the abscess cavity without contamination of the specimen by other mouth-bacteria. As you well know, one of the greatest obstacles in the study of pyorrhea has been that it is almost impossible in cases where the disease is marginal to determine with accuracy just what the exciter of that inflammation was, because of the mixed character of the infection, due to contamination of the parts by all of the mixed bacteria found in the oral cavity; and we have therefore been unable to say which one of the group of forms found in samples of pus taken from any case of pyorrhea has been the initial exciter of the lesion. But in the case of pericemental abscess, if we can secure samples of the pus contained in this pathological process before external fistula is established and rupture of the pus cavity has occurred, we ought to be able to say with considerable certainty just what is the exciter of infection.

In four cases I have had the opportunity to secure specimens of the pus, and have had bacteriological examinations made. The bacteriological investigation of these four cases showed as a constant factor in each one of them the presence of the diplococcus of pneumonia,—the exciter of the inflammatory condition which we know as pneumonia, the organism which was first discovered by Sternberg and afterward described by Fränkel and Miller under various designations. In two of the cases the infection was an absolutely pure culture of the diplococcus of pneumonia. In one other case we found, in addition to the diplococcus of pneumonia, a streptococcus which has not been thoroughly worked out. In each case these organisms were cultivated in pure culture, and, so far as the character of the diplococcus was concerned, it was determined not only by its cultural peculiarities, but also by inoculation into animals.

In the case of two rabbits inoculated with pure cultures from one of these, the animals died inside of ten days with all the symptoms of the peculiar form of toxemia which is produced by inoculation with the diplococcus of pneumonia.

Fig. 2.



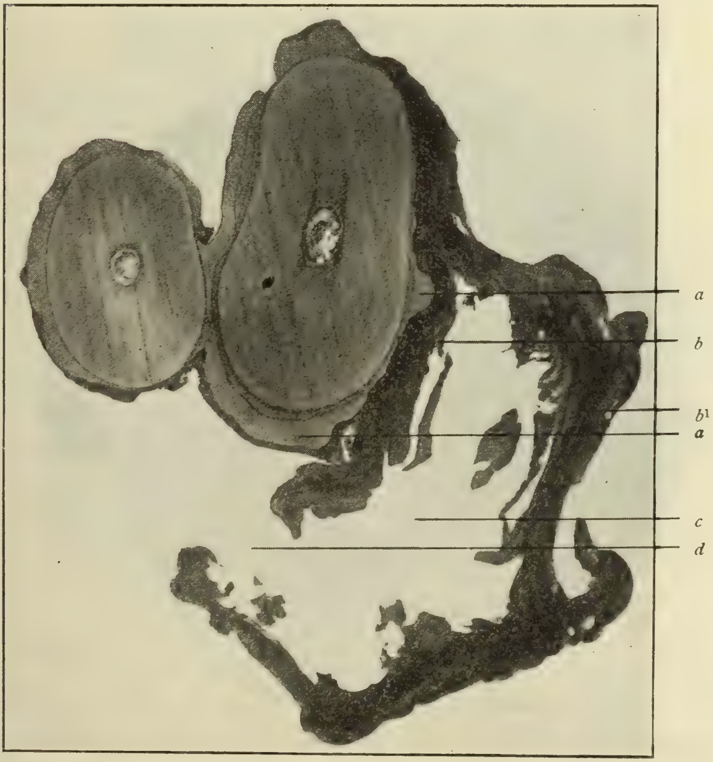
Pericemental abscess on upper molar.
(Front and back views.)

You have before you on the screen a photograph of a specimen of pericemental abscess which has already been published. The photograph was made by my colleague Dr. Cryer. (Fig. 2.) This photograph simply shows two views, front and back view, of the same abscess upon a molar, with the general topography and form of the whole condition. The pulp was alive in this tooth, as the specimen under the microscope showed very distinctly.

Here is a section of two of the roots of the molar in connection with the body of the inflammatory tissue forming the abscess walls, showing two interesting factors in the history of this disease,—namely, the records of its chronic and its acute stages. (Fig. 3.)

I would call your attention, in the first instance, to the seat of the lesion; that is to say that the focus of inflammation is in the structure of the pericementum, showing that it is an intra-periosteal abscess, and not a sub-periosteal abscess. In all the ordinary apical abscesses from dead-pulp infection that I have thus far examined I have found a sub-periosteal inflammation which tends to strip off the pericementum, denuding the apex of the root to a certain extent. In this case we have had a splitting apart of the pericemental membrane. You can see that the pus-cavity was in the central portion of the membrane, which was split apart by the inflammatory process and the walls thickened by the inflammatory growth of cells of the exudate and pericemental membrane, forming a fibro-plastic mass. You will notice, in addition, that the pericementum is closely adherent to the root at all points; there is no denudation, and the inflammatory focus is central to the membrane, not beneath it.

FIG. 3.

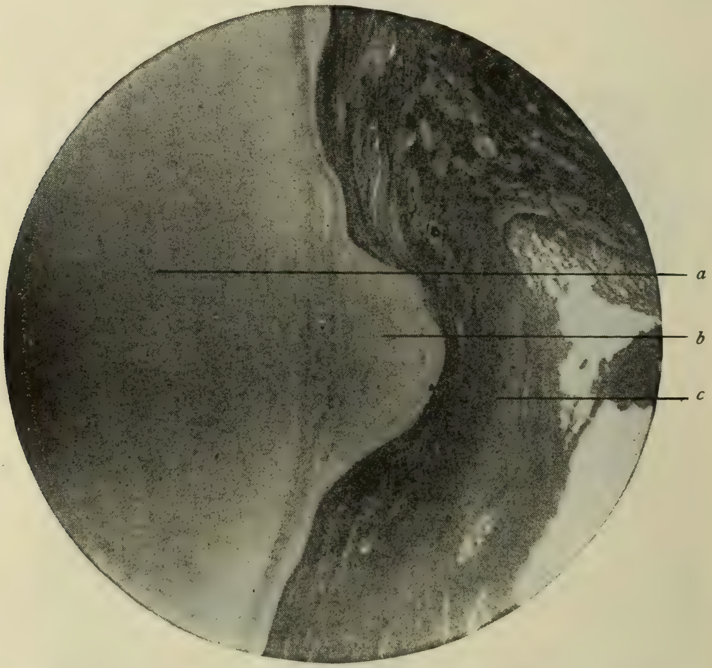


Horizontal section through pericemental abscess and molar roots of specimen shown in Fig. 2. *a*, *a*. Hypercementosis. *b*. Thickened pericementum covering root. *b*1. Thickened pericementum forming external wall of abscess-cavity. *c*. Abscess-cavity occupying central portion of the divided pericemental membrane. *d*. Section through fistulous outlet of abscess.

Underneath the pericementum notice particularly the thickening of the cementum itself at several points. I think all of you will agree that that hypercementosis was necessarily the result of an irritation very slight in character and of long continuance; that is to say we cannot get a growth of tissue of that sort by an irritation which is excessive. Dr. Palmer will bear us out in this, that the overstimulation of a tissue produces paralysis. It may be temporary, partial, or of any degree, but the overstimulation produces paralysis. In order to produce a hyperplasia, as in this instance, we must have had a stimulation of a slight character extending over a long period of time.

There is probably an analogy to be found in the condition referred to here to-day by Dr. Capon when he told us he had found a definite relation to be necessary between the amount of fuel and of oxygen in his furnace in order to secure the highest intensity of combustion, and, with our present knowledge of the subject, I think we do not go very far out of the way when we draw an analogy between the process of nutrition and the ordinary burning of coal in a stove.

FIG. 4.



Enlarged section of a portion of Fig. 3, to show intra-pericemental character of the abscess. *a*. Dentin. *b*. Hypercementosis. *c*. Thickened pericementum closely adherent to root and forming inner wall of abscess-cavity.

In that condition where we have a proper balance between the food taken into the economy as potential energy and those nutritive processes which render it kinetic as heat, vitality, or tissue, we get that stable equilibrium of forces which we include in the term physiology; or there is the condition in which the nutritive system is out of balance, and then we step over into the territory of pathology,—and so it has occurred here. There has been a localized overstimulation from some cause which has resulted in the formation of this hypercementosis, manifestly a constructive process.

Whatever may have been the cause, I wish to lay stress upon its chronic character.

In case of the pericemental abscess immediately adjacent to the hypercementosis, we have quite another thing; we have the evidence of an acute inflammation, a destructive process that has gone on rapidly and resulted in the formation of pus. It means that in connection with this tissue irritation has in some way diminished vital resistance, till a point has been reached when it became possible for the bacteria to enter into the tissue and to set up their activities, which resulted in the particular inflammatory process under consideration.

The next photograph on the screen is an enlarged picture of a portion of the preceding section, showing the hypercementosis and the inflammatory membrane covering it. (Fig. 4.) I throw this on the screen to show more particularly that the abscess is not subperiosteal, but intra-periosteal; and in the portion named may be seen the beginning of the inflammatory process itself in the central structure of the periosteum.

Fig. 5 represents a culture of the diplococcus of pneumonia, which is found to be the invading organism. It is seen in various ways under the microscope, presenting different characteristics. Under certain conditions we find the diplococcus with this peculiar halo around it. This is one of Professor Miller's specimens, taken from the blood of a mouse which has been poisoned with a culture from the saliva.

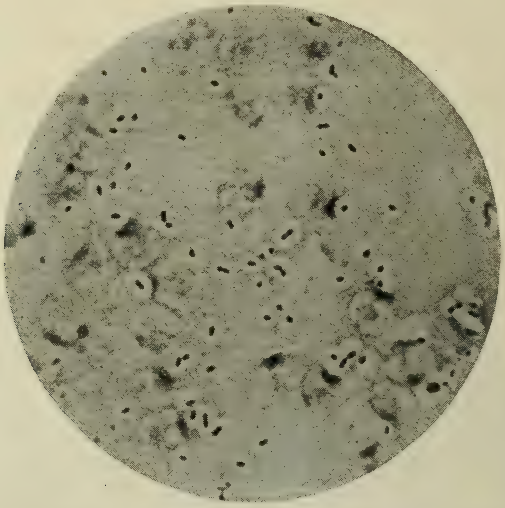
Fig. 6 is another slide by Miller, showing the diplococcus of pneumonia in blood itself. The specimen is the blood of a mouse, and we see here, among the larger blood-cells, the characteristic diplococcus.

When we come to study the method by which this organism has gotten into the tissue we find very many hold the idea that there must be a break somewhere in the continuity of the tissue in order that the organism shall find an entrance; that there must be some microscopic channel running from the external surface to the seat of the lesion, and it has been held also that the blood in itself has a sufficient germicidal power to destroy any bacteria. Figs. 5 and 6 will, I think, demonstrate that the blood-stream itself can carry these organisms through the economy, and they may not do harm until they reach some point of diminished resistance and there set up inflammation.

As bearing upon the question of the mode of invasion, I want to call your attention to the glands or glandular structures which are reported by Dr. Black as existing in the peridental membrane. Dr. Black published, in his work on the "Periosteum and Peridental Membrane," some years ago a description of these glandular bodies, and he stated there as an observation that they were found to be the seat of phagedenic pericementitis.

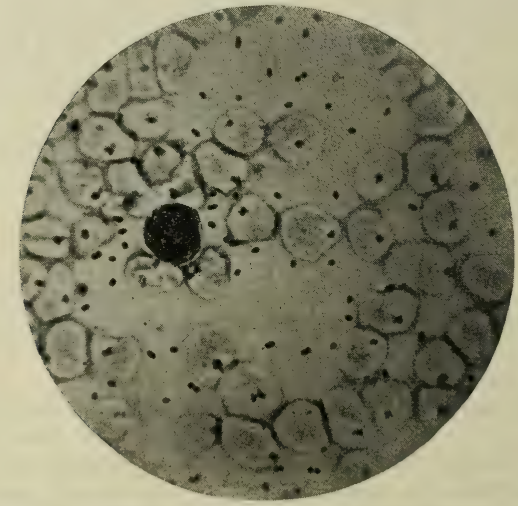
He has found these glands in close relationship to the tooth-root, and has followed them almost to the gingival surface. He suspects, although he has not yet demonstrated the fact, that they have minute orifices upon the margin of the gum, and, taking those two observations together, it is at least interesting as a probable mode or avenue by which these exciters of periosteal inflammation find their way into the tissue.

FIG. 5.



Pneumococcus with halo, in mouse blood. (Prof. W. D. Miller's specimen.)

FIG. 6.

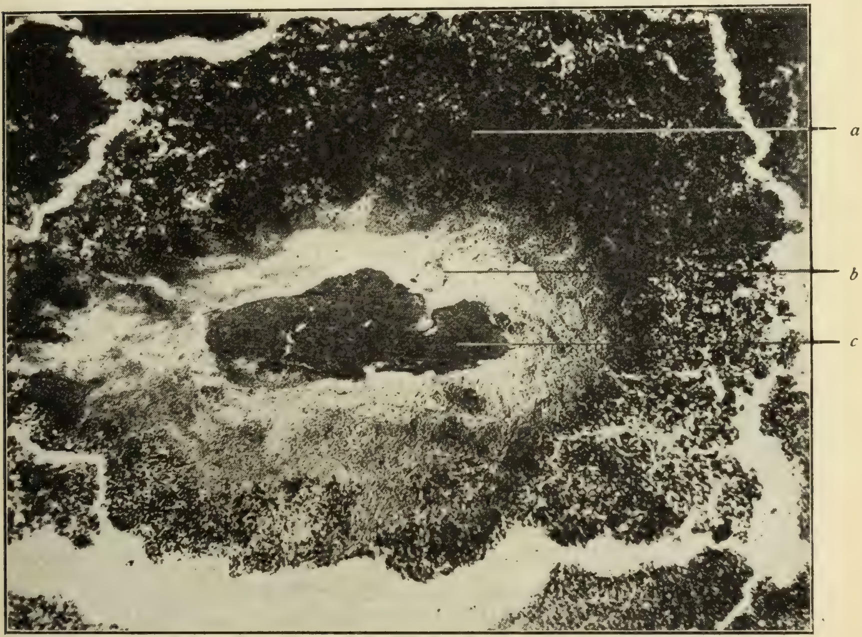


Pneumococcus (micrococcus of sputum septicemia) in mouse blood, x 1000. (Prof. W. D. Miller's specimen.)

Turning again to the possibility of pathogenic organisms being carried to the tissues through the blood-stream, I show you here (Fig. 7) a section of the kidney of a rabbit. It has been infected by pure culture of *staphylococcus pyogenes aureus,* one of the pus-producing microbes found in pericemental abscess, and which shows in almost a diagrammatic way the method by which the warfare between the invading bacteria and the resisting elements of the tissue is carried on. Please note that this is an experimental abscess. The culture was injected into the ear-vein of a rabbit, and after the death of the animal it was discovered that in the kidney there had been established a metastatic abscess by a transfer of the organisms from the point of infection to the kidney, setting up their activity at that point.

The dark central portion of the mass is a pure culture of the staphylococcus which has developed at that point. Immediately surrounding it is a territory which you see is almost free from cellular elements, an area of devitalized cellular tissue of the kidneys, a condition known as coagulation necrosis of the tissues at that point, caused by the poisonous effect of the toxin elaborated by these organisms, which comes in contact with the tissue and destroys its vitality. It is this portion of the tissue which is, as it were, in dispute between the mass of micro-organisms and the army of leucocytes brought to that point through the irritation set up by the invading bacteria.

FIG. 7.



Experimental abscess in the kidney of a rabbit: staphylococcus infection *via* ear vein. *a*. Cordon of leucocytes. *b*. Hyaline area of necrosed non-infected tissue. *c*. Mass of staphylococci.

Now, one of three things will happen: Either the abscess will enlarge until it reaches the free surface of the kidney and discharges, after which the balance of power is on the side of the vital tissue, and reconstruction will take place, or the process will go on and destroy the whole animal; or if the bacteria be destroyed by defensive leucocytosis, then reconstruction of the inflamed area occurs, and it will be filled up with new tissue. The devitalized tissue will undergo caseous degeneration; the organic portions will be absorbed, and what is left of the tissue débris may or may not become calcified. With reference to that point, I want to say a word as bearing upon the relationship of these calcareous deposits. Wherever these deposits have been found upon or in relation with the pericementum the conclusion has, I think, been jumped at that these calcareous masses were the cause of the inflammatory process. I am inclined to regard them as the result, and not the cause.

It is a well-known fact that wherever we have pus-forming bacteria acting upon a tissue, the result of their activity is the formation of a product having increased alkalinity as compared with the reaction of the tissue immediately surrounding it. The reaction is changed from slight to relatively high alkalinity. When the blood-plasma, with its dissolved calcium phosphate, is poured into this area of high alkalinity precipitation of the earthy salts takes place, which, in connection with the proteid elements of the plasma and pus, forms the concretions so often found in old abscess formations undergoing reconstruction. I think we have in that principle a sufficient explanation of these so-called serumal deposits upon the roots of teeth, and the reason why they probably are subsequent to and not the cause of the inflammation.

I said that pericemental abscess represented one form of pyorrhea alveolaris. Of course any inflammatory process of this sort, of which this is a type, implies in the first place a point of diminished resistance. That point of resistance may be produced by the deposit of urates in the pericementum when the general nutritional machinery is out of balance, or points of diminished resistance may be produced by a local irritant. Given an irritant and a point of diminished resistance deeply within the tissue, resulting in cell-death and bacterial infection, and we have a pericemental abscess. Given diminished resistance at the gingival margin, due to salivary concretions, or local irritation there from other causes, and we have gingival pyorrhea. In the one case we have pyorrhea alveolaris expressing itself as an ulcerative form, and in the deeper case we have the necrotic process expressing itself as an abscess.

I do not wish to go further with this matter. I have merely attempted to indicate some of the lines of thought that have grown out of a study of these very interesting conditions, and shall be glad to leave it with you at this point, so that you may aid me in coming to a more definite conclusion about it by criticizing the suggestions I have offered for your consideration.

I desire to here record my indebtedness to Professor Simon Flexner, professor of pathology, and to Dr. George C. Kusel, demonstrator of bacteriology, in the University of Pennsylvania, for their assistance in the bacteriological investigation of this subject.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 895.)

FIRST DAY—WEDNESDAY, AUGUST 8.

GENERAL ASSEMBLY—*Continued.*

FOLLOWING the paper by Mr. J. Howard Mummery, London, England,

A paper was read by Professor Dr. FR. HESSE, on "The Masticatory Movements of the Lower Jaw, and the Rules for Prosthesis Deducible Therefrom."†

Discussion.

Dr. SCHWARZE. Professor Hesse has shown you that the lower jaw executes a movement like this—the line runs thus: It is just as if we inserted one limb of a pair of dividers in one point and described a circle with the other limb, and again place the fixed limb in the other point and describe a circumference in that situation. Professor Hesse's plan of selecting a single point of the lower jaw as a point of departure for observations really amounts to a very important discovery. He, however, has not entirely completed his task; he has given us only a single projection of this line. This was effected by means of a pencil fixed to a spring. I first thought of photographing the line from the opposite side, but I succeeded in accomplishing my object more simply as follows: After taking a plaster cast of my brother's mouth, I placed a ring carrying a point around a premolar, arranging a plate of slate so that the point impinged thereon. Professor Hesse has antedated me by showing how the slate is to be placed. We are able to represent every movement of the tooth by this method,—by the observation of the individual point. I call attention to the form the tooth takes when ground out. We fashion the teeth so as to make them uniform in a certain sense. If we observe a single point we shall obtain this line. Naturally, it is difficult to draw this condition. I have here the slate.

The PRESIDENT. The communication of Professor Hesse probably requires additional explanation for some of you, which it is not possible for him to give here because it would take too much time. The discussion can be continued in the special Section, where Dr. Hesse will show models and an appliance with which he will demonstrate. He places himself at the service of any members to whom the question may be of interest.

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*The work of the Congress was divided into the following Sections:

I. Anatomy, Physiology, and Histology. II. Special Pathology and Bacteriology. III. Operative Dentistry; Special Therapeutics. IV. General and Local Anesthesia. V. Prosthesis, Dental Orthopedia, and Facial Restorations. VI. Dental Education. VII. (*a*) History of Dental Art; Museums; (*b*) Legislation, Jurisprudence, and Deontology. VIII. Hygiene and Public Dental Services. IX. (*a*) Practical Demonstrations of Operative Dentistry; Surgical Clinic and Anesthesia; (*b*) Practical Demonstrations of Prosthesis and Prosthetic Clinic. X. (*a*) Museum; (*b*) Works presented by Schools, Societies, and Practitioners.

†Dr. Hesse's paper is printed in full at page 1004, October issue.

Dr. Amoedo. I have only a few words to say: First, that Professor Hesse showed too much modesty when he told us a few moments ago that his article should not have been assigned to the General Assembly. On the contrary, we are happy that his paper should have been read in the General Assembly, because it is a question which forms to-day the topic of discussions in different countries, and there are a great number of appliances which have been recently constructed which imitate the movement which Dr. Hesse has so wisely described. In one of the coming sessions I shall exhibit all the articulators which have been constructed up to the present time, and which imitate the lateral movement of the mandible as described by Dr. Hesse. Among them we find the one invented by our colleague Dr. Schwarze. There are others, such as the one by Professor Louis Walter, etc. All these appliances imitate the lateral movements of the jaw. I intend to show you all the steps of the technique necessary for the construction of articulators which can imitate the movements of the lower jaw.

Discussion closed.

Dr. Calvin S. Case, Chicago, Ill., then followed with a paper entitled "Principles of Dento-Facial Orthopedia." This paper is not reproduced here, inasmuch as the topic has already been presented at some length in this journal.

After the reading of Dr. Case's paper the General Assembly adjourned to meet as the several Sections.

SECTION I.—ANATOMY, PHYSIOLOGY, AND HISTOLOGY.
SECTION II.—SPECIAL PATHOLOGY AND BACTERIOLOGY.

The two Sections met in combined session, and were called to order by the president of Section II, Dr. Leon Frey, Paris.

Dr. Frey, in a brief address, said in part:

Allow me to welcome our foreign confrères, those of the provinces, and those of Paris, who have come here in order to participate in the work of Sections I and II.

I have to thank the members of the General Committee and of the National Committee; it is to their activity and intelligence that we find ourselves this evening in the presence of such an attractive scientific program.

Allow me also in the name of the Section over which I have the honor to preside to say to my colleagues Davenport, Mendel Joseph, and Loup how valuable their assistance has been to me. I must also thank our secretary, Dr. Charpentier, for his valuable help.

Mr. A. Hopewell Smith, London, England, then read a paper, "On the Association of Inflammatory Conditions of the Dental Pulp with Certain Adventitious Dentins."*

There was no discussion.

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*This paper is printed in full at page 1097 of this issue.

A paper, entitled "Bacteriological Study of Pyorrhea Alveolaris," by GEORGE COOK, D.D.S., Chicago, Ill., was then read by the author.*

Discussion.

Dr. CHOQUET. It is regrettable that Dr. Cook did not present to us his complete results. I have noted several things in his work that have attracted my attention. First, in connection with the etiology of pyorrhea alveolaris he did not mention the names of those who have earnestly worked on this subject, such as Galippe and Magitôt, who in 1890 and 1892 presented to the Société de Biologie the results of the experiments they had made upon the bacteriological etiology of pyorrhea alveolaris, which study led them to believe that a specific bacillus was the cause of the disease. This specific organism was a kind of diplococcus, which, when inoculated in a rabbit or guinea-pig, produced after a few days a disarticulation of the foot. I feel that this should be said in order to give to every one the credit deserved.

I will make some personal observations on the work of Dr. Cook. He has shown us some photographs of the microbes found by him, but I am of the same opinion as one of the members of the Congress who finds a great resemblance between this preparation and that of fungus growth, and that is what I think the photograph shows.

The cultural characteristics reported by Dr. Cook are insufficient. As a general rule, in order to fairly present a work on bacteriology, we must study the development of the organism in culture-media. He should have told us after what length of time the cloudiness was produced in the bouillon, and whether the precipitate was in the form of granules or clouds; we know nothing about them. We do not know whether the gelatin was liquefied or whether the growth takes the shape of a nail, as with the pneumococcus. He told us that the organism developed in gelose, but he did not observe the growth in serum. Judging from the properties which this microbe seems to possess, serum would probably be liquefied. These are the characteristics which have not been observed. I regret that Dr. Cook did not show us a pure culture of his micro-organism, which we desire to see and examine. It is all very well to present a portion of a preparation, in which only the desired features are shown, but nobody knows what might be found in the rest of the photograph.

I do not think that I am hypercritical, as I think that Dr. Cook's work could be revised,—at least its conclusions.

Discussion closed.

Dr. JULIEN TELLIER, Paris, then read his paper, entitled

THE NUTRITION OF DENTIN IN RELATION TO PHYSIOLOGICAL INFLUENCES.

When the Committee on Organization of the International Dental Congress offered to me a few months ago the task of writing a report on the nutrition of dentin in relation to physiological influences, my first decision was to decline the honor. After considering the question I nevertheless accepted, my intention being as follows: To try to point out in a few pages the principles of the problem; to collect all the literature on this subject, and to point out what we know and what we do not know; and to use all the knowledge that we possess as a basis to find out what are the questions that we have to study and explain in order to get a precise knowledge on the nutrition of the dentin.

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*This paper is printed in full at page 1102 of this issue.

First. When we try to study the details of the nutrition of an organ or of a tissue, we see that this nutrition is the result of the nutrition of its components, the cells or groups of cells which compose it. We know that the cell is capable of selecting from the surrounding substances, and that cellular groups, such as the bones and teeth, assimilate in different proportions the salts of calcium, magnesia, etc. And if we ask Physiology how such a selection takes place, she answers that she is in complete ignorance, or nearly so.

In connection with nutrition, we can divide the tissues into those deprived of vessels and those that are vascular. The first kind is nourished by imbibition; the plasma and lymph of the neighboring tissues penetrate little by little, and suffice to repair its elements, which are not very active. In the vascular tissues nutrition is carried on directly by the blood. This is a *résumé* of the general notions which physiology gives us.

Second. To study the nutrition of a tissue under physiological influences strictly means knowing, more or less, the mechanism and conditions of this nutrition; to be able to change successively each of these conditions, the others being normal, and to watch the results; this is the most favorable method of study. To be able, however, at the will of the investigator to change a single condition of nutrition of a tissue and to have full control of the variations caused by the modification of this condition would mean the realization of a physiological ideal that we can scarcely pretend to reach. This is the true experimental method, and the only one which can give indisputable results—facts that can be reproduced under similar conditions. The clinic alone would be a very feeble aid in this physiological study; the data are too uncertain, and the methods too misleading; in consequence we must not seek from them more than they can give us.

In going over this rapid survey of the different methods of research, in order of least importance, we have one more method to mention,—the speculative method, which is sometimes capable of furnishing useful data. The analogies of a tissue with another more or less similar can be of great help in securing a new hypothesis that may be used as a starting-point for new investigations.

In order to limit our subject, we have to point out what we understand by physiological influences in this study of the nutrition of dentin. We mean, first, properly physiological influences that we can change, and be in full control of the conditions of these changes, in a laboratory experiment,—such as the action of the nervous system and of the circulatory system. We next take cognizance of the conditions called physiological in the sense of being non-pathological, and which can exercise some influence on the nutrition of a tissue, yet which cannot be studied in relation with their modes of action, and therefore must be studied from the point of view of their results. We will deal successively with the influence of age, sex, region of the body, temperament, heredity, race, food, geological constitution of the soil, nature of the drinking-water, with the special conditions of pregnancy and of the nursing of infants, the condition of the oral cavity, the habits of life, occupation, and functional assimilation.

Third. The study of the nutrition of the dentin embraces the research of the phenomena of assimilation and disassimilation which takes place, or which may take place, in the substance of a tissue. It would not be without profit to recall briefly the structure of the dentin and the physiological phenomena which characterize this highly differentiated portion of our organism from its appearance until the completion of its building process.

The tissue in which the dentinal structure shows itself typically is in the hard and non-vascular variety. Dentin is a hard, highly elastic substance, white in color, with a slight yellow tint. The mass of the dentin consists of an organic matrix richly impregnated with calcium salts, everywhere crossed by canaliculi, which, with very few exceptions, radiate from the pulp-cavity to the surface of the tooth. The organic matrix, after the removal of the calcium salt and when dried, is converted into a yellow substance not unlike horn. It is insoluble, and does not swell up in water. When submitted to prolonged boiling it dissolves, and is converted into gelatin, similar to the substance obtained in like manner from bone, and consists of the substance known as collagen, which is chemically dehydrated gelatin. Besides this substance, which is also known as ossein, we find elastin, an albuminous substance found abundantly in ordinary elastic tissue. The linings of the Haversian canals and the sheaths of Neumann are probably composed of the same substance.

The collagen matrix is impregnated with calcium salts. In a fresh human tooth it was found that sixty-two per cent. of its weight was composed of inorganic substances, the tooth cartilage being twenty-eight per cent., leaving a residue of ten per cent. of water, which can be evaporated at 100° C. The mineral substance is composed principally of tricalcic phosphate and, in less quantities, of calcium carbonate, calcium chlorid, and of magnesium phosphate. The analyses of Von Bibra, Berzelius, and Aeby give different proportions. Black's researches tend to prove that there is very little variation in the percentage of the inorganic substances in strong or frail teeth. Normally, there is no visible structure in the matrix of non-vascular dentin. Von Ebner, nevertheless, describes a fibrous structure which Mummery has found in carious teeth. The description of Von Ebner is strongly confirmed by the microscopical study of vaso-dentin.

The matrix of the dentin is everywhere permeated by the dentinal tubes. To be noted are their divisions, curves, and principally their contents. Tomes says, "Two facts are demonstrated: the one that the tubes have definite walls, the other that these walls are singularly indestructible. These are the sheaths of Neumann, the existence of which has been denied by Magitôt and Dr. Sudduth. The tubes are filled with a protoplasmic element which constitutes the so-called Tomes fibrils, and these occupy all the ramifications. The true nature of these fibrils has not as yet been established. Classically, these fibers are prolongations of the odontoblasts. They could also be long prolongations of the deeper cells of the pulp; in which case they would pass through the odontoblastic layer before penetrating the tubuli. Under the cement and the enamel the dentinal mass presents different characteristics: the presence of lacunæ of very small size (granular layer of Tomes). Larger lacunæ form the interglobular spaces, which cannot be considered as a normal part of the dentin, since they are only a sign of an arrest in its development."

According to Bödecker, with an enlargement of two thousand diameters it can be seen that from the borders of the dentinal fibrillæ thin prolongations penetrate the dentin. He describes a fine network in the fundamental substance, and concludes that the dentin is everywhere penetrated by a protoplasmic network which is derived from the fibrillæ, and which is a great deal more delicate. In the smaller interglobular spaces, which constitute the granular layer, there is also living protoplasm in great quantities, and this protoplasm is in relation on one side with the dentinal fibrillæ, and on the other side with the organic contents of the lacunæ of the cement.

Physiologically, the odontoblasts have to be described with the dentin, while anatomically they belong to the dental pulp, although their *rôle* in the future life of the dentin has as yet not been definitely determined.

It can be concluded from his descriptions that Bödecker believes that the intradentinal network is in communication with the odontoblasts by means of their prolongations, the fibers of Tomes. Mummery believes that the fibrillar structure of the dentin is formed by a network of delicate connective tissue which is not derived from the odontoblasts, but from the general connective tissue of the pulp, and in some way independent of them.

Fourth. The normal phenomena of the nutrition of the dentin have to be studied, first, during development; second, after the building-up process is completed. This distinction is an entirely artificial one, as it has been demonstrated that the pulp deposits dentin during the greatest part of its life.

The study of the development of the dentin in regard to nutrition is included in the study of calcification. We do not intend to recall and discuss all the hypotheses in connection with this point. The chapter on this question in Tomes's "Anatomy" is very complete, and constitutes, with the researches of Morgenstern and Walkhoff, a group of works to which we refer our readers. We will only recall the principal stages in the calcification of dentin, the knowledge of which is due entirely to anatomical methods, with the exception of certain facts which are due to chemistry.

The impregnation of the collagen substance with calcium salts constitutes calcification. Is the union of these different substances a true chemical combination? This is not known; we can say, however, that there is not a very stable relation between the organic substance and the mineral substance of the calcified elements.

In regard to the process of calcification, we know that since Waldeyer the odontoblasts have been looked upon as the true agents in the formation of dentin. The theories of the transformation and secretion of the odontoblasts have been discussed, and were afterward accepted for a long time. Magitôt's opinion makes of the dentin a product of the elaboration of the odontoblasts, but rejects the secretory action. O. Walkhoff remarks that, with the exception of some peculiarities, the hypotheses on the development of the dentin can be connected with one of these two theories more or less modified. He nevertheless rejects the conjugation theory of Morgenstern,—viz, that the embryonal cells of the dentin are perpetually occupied in the formation of the dentin, and are later replaced by new cells. Moreover, that those elongated forms, erroneously known under the name of odontoblasts, are the result of the arrangement of these cells one beside the other, and of their fusion; and that the fibers of Tomes are the result of the elongation of the previously formed cells.

This theory, supported and developed by Hoehl, is refuted by Walkhoff, who takes his stand upon his own researches, in which he describes the transformation of the odontoblasts, which he considers as the agents in the formation of dentin.

The secretory theory, at least in regard to dentin, seems to have lost much ground. The theory of transformation, of the conversion of the odontoblasts, seems to be the one in favor. This theory, when reduced to its simplest expression, is based on the hypothesis which considers that the external portion of the odontoblast undergoes a transformation into a gelatinous substance, which forms the seat of calcification, while the axial portion continues to present the characteristics of a soft tissue.

Von Ebner's ideas, which are in a general way supported by Röse and Walkhoff, claim the existence in the dentin of an extremely delicate fibrillar structure of a connective-tissue nature, which is the result of the transformation of the peripheral portions of the odontoblasts, in which the central portions form the fibers of the dentin. It is this fibrillar network of connective tissue which is impregnated with calcareous salts. In fact, according to Von Ebner, all the dentin is derived from the odontoblasts.

Mummery has confirmed the observations of Von Ebner on the fibrillar structure of the dentin, but interprets the facts in a different way. He does not believe that the delicate connective-tissue network is derived from the odontoblasts, but, as we have already said, from the connective tissue of the pulp, which he has shown exists in the general periphery of the organ. This tissue seems to penetrate the matrix of the dentin, passing through the odontoblasts, just as the fibers of Sharpey penetrate in bone. It is this connective tissue which is the seat of calcification.

In the last edition of his book Mr. Tomes accepts the theories of Mummery and J. Leon Williams, and also adopts them. It results from these opinions that the histogenesis of dentin is identical with that of bony structures at least in one respect,—in the fibrous hypothesis,—with the difference that the bony cell or osteoblast manufactures the bony structure at the periphery of its cellular body, while the odontoblasts, or some other cells of the pulp according to the ideas of Von Ebner and Bödecker, build up the dental framework only around the peripheral prolongations. Without wishing to enter into details in regard to the arguments in favor of these hypotheses, we can say that the comparative anatomy, and especially the study of vaso-dentin and of the transitional forms between the vaso-dentin and the non-vascular dentin, furnish a great number of proofs in their favor. The development of dentin is in this way likened to that of an osseous tissue, to the development of those tissues which can be compared with the dentin, such as we find in the endo-skeleton and exo-skeleton of certain fishes.

The anatomical study of the vaso-dentin and of the calcification of this variety will probably throw some light on the development of hard dentin. Here, in fact, the fundamental substance appears as a connective tissue which has preserved its form, and in which the characteristics are not destroyed by the presence of some other system of tubes, interglobular spaces, or other peculiarities.

On the other hand, comparative anatomy shows us the existence of a certain number of varieties of dentin which are transitional forms between vaso-dentin and non-vascular dentin. The study of these different varieties would prove that nutrition does not take place in a very different manner in vascular and non-vascular dentin.

In typical vaso-dentin nutrition is assured by the existence of canaliculi occupied by the blood-vessels, which carry the nutritive materials directly in contact with the fundamental substance. During the calcification of ordinary dentin there is an abundant capillary plexus at a very short distance below the layer of odontoblasts; these vessels proceed inward as dentin is formed.

If we try to represent to ourselves the method of nutrition of the dentin during its development we can imagine, at least as a probable hypothesis, that things take place in the following way: The nutritive materials are carried by the vessels of the pulp, which, with very rare exceptions, do not penetrate the tissues; they stop at a certain distance from the cellular layer bordering the pulp layer represented by the odontoblasts. This layer is not a continuous one; it has not the characteristics of epithelium. The intervals are occupied by the basis substance of the connective tissues of the dentinal papilla, in which wandering cells, and even blood-corpuscles, may be found (Renaut). This is a proof that all the elements of blood-plasma can pass through the odontoblastic layer. The calcium salts impregnate the fibers that we know to exist, whatever their origin may be; also between the dentinal fibrillæ. And this impregnation is characterized by the production of the globules of dentin and their coalescence, which takes place in a more or less normal way, with or without the formation of those spaces so much discussed which constitute the interglobular spaces.

Once that the building-up process of dentin is over (and we know what this means, as it is a settled question that the pulp produces dentin until old age), what do we know of the intimate life of this formed tissue when it has reached full development? Nothing, or nearly so; at least we know nothing about the principal phenomena which take place. We know, or at least we believe, that there can be great variations in the mineral salts which the dentin contains. We know that in the substance of this tissue a process of repair and defense sometimes takes place (secondary dentin) as the consequence of some pathological disarrangement. It may be that the only function of the odontoblasts is to maintain the tubes of the dentin open by means of their prolongations; and in this way assure their permeability. In that case nutrition takes place by means of the blood-plasma of the vessels of the pulp, which would travel all along the complicated system of the anastomosing protoplasmic prolongations of the cells of the dentin, just as the liquid which, through capillary attraction, travels up cotton fibers, or as the oil in a lamp.

Fifth. Before reaching the end of these general considerations we have to say a few words on the sources of nutrition of the dentin. These can only originate from the blood-vessels of the pulp and of the circulatory system of the alveolo-dental ligament. Both systems originate from a common trunk, two branches of which go to the pulp and one to the pericementum; but the pericementum also receives branches which come from the alveolar walls, and which anastomose with the preceding ones, and which can, in case of necessity, act as collateral blood-supply to the pulp. Whatever it may be, it is accepted that the pulp supplies the nutritive elements of dentin, and that this function is prolonged until old age, not always without causing some disturbances.

J. Head has observed that the dentin was sensitive several months after the loss of the pulp, and thinks that this is a proof that the dentin has a nerve- and blood-supply independent of the pulp. In regard to the circulation this has been proved, as we have already stated. The arterial alveolar branches which penetrate the alveolo-dental ligament are capable of assuring the nutrition of the pulp after obliteration of the principal trunk of the pulp, and in consequence, of assuring the preservation of the pulp with its normal characteristics. But if the pulp is destroyed it is permissible to suppose that the arterioles of the ligament which assure the vitality of the cement carry also to the dentin the nutritive materials it requires. The lacunæ of the cement communicate with the interglobular spaces of the dentin and osmosis can take place through the cement to all portions of the tooth, and as the avenues between the cement and the dentin are not as wide as those between the pulp and dentin the process must be slower and less effective. There being but two means of blood-supply,—namely, the pulp and the cementum, each using the process of osmosis for ultimate nourishment, it is clear that if the pulp be destroyed the cementum must undertake the work formerly performed by both, and that it does do this seems to be emphasized by the fact that cementum tends to exostosis and thickening when the pulp is gone, as though making preparations for extra work.

The nutrition of a tissue, whatever its sources may be, is under the control of the nervous system; microscopical researches have not demonstrated the presence in the dentin of terminal nerve filaments coming from the nervous trunk of the pericementum; the existence of these filaments is, however, thought by J. Head to be probable, neither has it been demonstrated in a positive way that the nerve trunks of the pulp send nerve branches which penetrate and terminate in the dentin. The majority of authors think that the nerves of the pulp are in connection with the odontoblasts, and Hopewell Smith has gone as far as to compare the odontoblasts to the epithelioidal cells of the olfactory membrane.

Sixth. The nervous system is the great regulator of the nutrition of the organism. It acts directly on nutrition, or indirectly by the intermediary of its influence on the blood-circulating system. A very interesting series of experiments could be made in regard to the influence of the nervous tissue on the nutrition of the dental tissues. Naturally, these experiments would demand considerable time and labor. If anything has been done in this line of work, I have no knowledge of it.

Besides the action of the nervous system, can we experimentally modify the circulation in the vessels which carry the nutritive materials to the dental tissues? In a general way the intra- or peridental circulation can be increased through functional influences, by slight irritation, or by conditions which are found in certain pathological states.

Brubaker says that loss of calcium from the bones and teeth is witnessed in pregnant women. The blood-vessels of the pulp, in virtue of their absorptive power, impair the integrity of the chemical union of the calcium salts and the organic dentin. Congestion is also regarded by Fehling as playing a great *rôle* in the pathogenesis of osseous lesions of osteomalacic character, and this hyperemia is due, according to this author, to a stimulation of the vaso-dilator nerves of bone. It might be possible that an exaggeration in the circulatory activity brings about changes in the dental structures.

Total suppression of blood-supply by the destruction of the vessels of the pulp and pericementum takes place under certain pathological conditions (advanced stages of pyorrhea alveolaris). It is possible that if these same conditions were induced for experimental purpose, some knowledge of the nutrition of dentin could be derived.

Seventh. In the absence of results obtained with the method *par excellence*, the physiological method,—results which would be free of criticism,—we have to recur to other methods by means of which we can derive some knowledge on the question we are dealing with.

The first and the most important class of these modifications consists in the changes produced in dentin under the influence of age. Nearly everything we know on this question we owe to the researches of Galippe and Black. The variations in the physical characteristics of teeth (resistance, density, etc.) seem to be due to differences in proportion between the different elements which constitute the tissues, especially dentin. The proportion of mineral salts varies with the conditions of nutrition. The study of the causes of the variations in the proportion of organic materials brings us directly to the study of the conditions which may change nutrition. Galippe, after demonstrating that there is a constant relation between the physical properties of teeth and their chemical composition, shows that the density increases from childhood until adult age, and that the proportion of chemical constituents seems to increase after the apparent full development. Deciduous teeth are less dense than the permanent ones. But, as Galippe's researches were carried on with sound teeth, it is possible that these differences are related to the three hard tissues which enter into their formation. Black, on the contrary, has worked on sections made at the neck of the tooth, and his researches constitute all our knowledge on the variations in the composition of teeth. His conclusions have been very much discussed; he has answered sometimes in a violent tone the purely theoretical objections of his opponents. Tomes seems to be the only one who has performed experiments to verify Black's results. Black believes, contrarily to Galippe, that the difference in the density and in the percentage of calcium salts are not the conditions on which depend the resistance of the tooth and its hardness, but that these seem to be due to the condition of the organic matter of the tooth. In fact, the variations in density are very small; there is, nevertheless, a continuous increase in the density and the percentage of calcium salts from childhood to adult age; the resistance diminishes with age. As a *résumé* of Galippe and Black's experiments, it can be said that they have demonstrated that the proportion of mineral salts increases with age, which means an increase in nutrition, which becomes more active with age, a thing which is proved by the increase in organic substances, a state characterized by an increase in the assimilating phenomena.

A unanimous opinion is that, clinically, there are to be found strong and frail teeth, or, as Galippe says, the coefficient of resistance of different teeth is very variable. If it could be demonstrated that this resistance is in relation with the density, then we would have a scientific explanation of this difference. But it is principally on this question that the researches of Black have been attacked. If we go over the many tabulations which accompany his work, and which are the proofs of his experiments, we must conclude, as he does, that there is less difference between the so-called strong and frail teeth than between the teeth of the same person. We will add that if we accept Black's statements it becomes impossible to find an explanation for the variations in the coefficient of resistance in the changes in dental nutrition or its effects under the influence of temperament or individuality.

By the term calcification let there be understood also a chemical union; not a deposition merely between the calcium salts and the organic dentin brought about by the agency of living protoplasm. Moreover, let it be borne in mind that calcification, once established, is not forever permanent, but that living dentin, like living matter in all other parts of the body, in the performance of its functions is continually undergoing disintegrative changes by the assimilation of nutritive materials furnished by the blood-vessels of the pulp. We conceive, therefore, that the evolution of a normal tooth will depend on the physiological activity of a highly differentiated form of protoplasm differing somewhat in chemical composition and life-duration.

This being accepted, it inevitably follows that the introduction of an extraneous force capable of impairing the composition of protoplasm and interfering with the harmonious play of its physiological forces would result in an impairment in the products of the activity of that protoplasm, and this no matter how perfect the food-supply might be.

Eighth. In the study of the influences of food-supply on the nutrition of dental tissues we will find ourselves in the presence of facts of greater precision. It is necessary that these tissues, and dentin in particular, should find in the organic medium the calcium salts which enter into their composition. They can only be furnished by the food, liquid or solid.

In the absence of writings on the nutrition of dentin under the conditions enumerated, we will rapidly examine the results of investigations on the variations of the osseous system as the consequence of the use of these methods. These conclusions, until we are better informed, can be applied to dental tissues.

The continued diminution of calcareous salts diminishes the proportions of calcium salts in bone. The presence of calcium in the food is necessary for the building and repairing of the skeleton, but the conditions of assimilation are not well known. The addition of salts has given incomplete and contradictory results. An acid diet exercises a harmful influence on calcification. These are the contradictory results of the many experiments on this question. Let us see what the clinical experiments tell us.

A great number of examinations carried on in public schools have led Röse to make the statement that the use of water and foods poor in calcium has a detrimental influence on the structure of the teeth. There is nothing particular about this fact, as we know that we can induce rhachitis in small animals by feeding them during the development of their bones with food poor in calcium, and there is no doubt that the teeth of such animals are poorly calcified. The use of white bread has very bad effects, but the use of Graham bread is better, as this bread is rich in calcium salts. Milk and eggs are very rich in calcium salts; meats contain relatively less salts.

The conclusions of Röse are not free from criticism. We notice that he has selected the color of the teeth as a standard to go by. Röse says, and we know through daily experience, that the teeth of dirty gray color, as well as those of a yellowish white color and chalky appearance, are comparatively soft teeth and decay easily, while those of a brilliant yellow or yellowish white are more resistant. He observes principally three colors,—the yellow, the yellowish white, and a bluish-white gray.

If we think of all the theories that have been advanced, of all the hypotheses, and of all the resulting contradictions, many things could be said in this respect, but we could never say anything as good on this question as what J. Leon Williams says in his important article in the DENTAL COSMOS.

This question of the relations of food to the nutrition of the dental organs is closely related to the study of the effects produced by the administration to these tissues of phosphatic drugs. It is of common knowledge in medicine that it is possible to act on the nutrition of bones and teeth through the intermediary of phosphatic drugs.

Certain substances introduced in the organism are transported and fixed in the teeth. It is in this way that Robertson, feeding rabbits with madder (*rubia tinctorum*) was able after a certain time to measure the amount of development of the teeth by measuring the colored layers of dentin secured by the use of this agent. Is it the same in the case of the phosphates?

The difficulty did not lie in alimentation at all, the usual foods furnishing an ample supply of calcium salts, but it lay entirely in assimilation. Whatever the quantities and form of phosphates taken in, they are immediately eliminated.

Clinicians, nevertheless, and the majority of them, admit as a demonstrated fact the usefulness of the treatment with drugs of those diseases in which it is supposed that there has taken place a disintegration of the tissues containing calcium salts. This question requires more study and experimentation; at least in regard to the dental system, the one to which our conclusions refer.

Ninth. Pregnancy is a cause of profound changes in the female organism. These changes affect all organs, both their anatomical structure as well as their physiological functions.

It is generally admitted that pregnancy is the cause of disorders in nutrition of the dental tissues which change their structure and make them soft, and in consequence more susceptible to the action of caries. The first true scientific researches on this subject are due to Galippe. He demonstrated that pregnancy diminished the density of teeth, and made them lose a marked proportion of their mineral salts and made them more susceptible to the ravages of caries. In the great number of examinations made by Galippe in order to ascertain the changes in the density of teeth, it was in the teeth of a woman who died during parturition that the least density was found. There are experiments which give reason to the opinion generally accepted that the child nourishes his osseous system at the expense of the elements of the bones and teeth of the mother.

Notwithstanding the results of Black's experiments, let us accept at least for the time being the results of Galippe; that is, that the density of teeth is decreased during pregnancy. It is also known that he has proved that the density is greater in teeth in which there is a greater proportion of mineral elements. The elimination of calcium salts has also been demonstrated by Gautrelet. How is it possible to explain the decalcification? It is known that the decalcification of the osseous tissue is very great in osteomalacia, but it is explained by the presence of an acid. This acid is supposed to be lactic acid, its presence having been detected in osteomalacic bones. What causes the production of the lactic acid found in those osseous tissues? The living organism is constantly manufacturing acids, but it also destroys them under physiological conditions (Bouchard). Pregnancy seems to diminish this destructive power of acids which accumulate in the organism.

If it be considered that the decalcification of teeth during pregnancy is a fact, then we are authorized to look for an explanation in the theories enumerated. Nevertheless, we think it better not to make any definite conclusions until new experiments shall have explained the phenomena of this decalcification.

We have not found any writings as to the relation of the nursing of infants to the teeth of the mother, but it has been admitted that the coefficient of resistance is decreased during the nursing stage, which means that the chemical composition of the teeth is changed. Facts do not demonstrate this statement. Billeter quotes statistics of Von Bunge in which it is proved that the proportion of decayed teeth is less in women who nurse their infants than in those that do not.

Tenth. The influences of the oral surroundings on the nutrition of the dental tissues is, although accepted by every dentist, very far from being a demonstrated fact. It is probable that the conditions of the saliva are factors in the production of gingivo-dental disturbances. Its alkalinity and acidity are in relation with the state of general nutrition. But if the surrounding conditions of the teeth can be considered as predisposing or efficient causes of the diseases of the teeth, either by acting directly on the structure of the teeth or by changing the qualities of the habitat of the micro-organic cultures, nothing on the contrary authorizes us to think that there is a relation between the environment and the nutrition of these tissues. The attack of the inorganic structure of the teeth by the acids of saliva is a chemico-pathological phenomenon, and not a physiological one, and in consequence is not in the province of this study.

The general phenomena of nutrition are undoubtedly influenced by the system of living, but it is not possible to state on a solid basis that phenomena of this nature have influence on the nutrition of dental tissues. It is commonly asserted that the system of living influences the assimilation of materials necessary for the building-up process of tissues, and in particular those of a dental nature.

Eleventh. The nature of the functions of the teeth is entirely mechanical; their principal use in man is for masticating, and in some animals for seizing and tearing the food. Has the stimulation of function any influence over the nutrition of the dentin?

This question has been elaborately studied by Morgenstern, and it would be an injustice to discuss the conclusions of such a highly learned man without having seen his preparations (sections, etc.), or without having made verifying researches.

Twelfth. We have reached the end of the review that we proposed to ourselves to write. We have examined all the causes capable of influencing the nutrition of the dentin under different physiological conditions, and this examination has put before us so many and very often so contradictory theories that it seems impossible to us to make a summary of the preceding pages.

As regards general anatomy, there is not one kind of dentin, but several kinds, of simple or complex type, and there exists a certain number of intermediate varieties which, according to Tomes, form the connecting links between the simplest form of dentin and that of the most complex type. Morgenstern believes that the first stage of all kinds of dentin is the vaso-dentin, and that it is through successive degrees that it passes from vaso-dentin, the oldest in regard to phylogenesis, to the latest stage, the non-vascular dentin. This hypothesis is vividly refuted by various anatomists, Walkhoff among them. If, nevertheless, this hypothesis were a fact, the study of the nutrition of vaso-dentin would give us a certain amount of precise knowledge, which could be used as a starting-point in the researches into the nutrition of hard dentin; particularly we would acquire knowledge concerning the functions of the blood-vessels of the dental germ, which, according to Morgenstern, take a direct part in the building of dentin, while it is otherwise generally admitted that they play only an indirect *rôle* in carrying to the dentin the calcareous materials it requires.

The comparative study of the several varieties of dentins would probably give us a precise knowledge of the structure of non-vascular dentin and of its neighboring pulp portions; and although we possess well-demonstrated facts on this question, we nevertheless are in the dark in regard to many questions which we cannot answer with a degree of certainty, and whose solutions are necessary for the study of certain physiological facts, such, for instance, as the formation of interglobular spaces and their significance in regard to the nutrition of dentin; the origin of the delicate connective-tissue network that Von Ebner, Bödecker, and Mummery describe in the dentin, principally the histogenesis and morphology of the odontoblasts; the nature of the fibers of Tomes, of the sheaths of Neumann, etc. The *rôle* and the significance of the odontoblasts, so long considered as demonstrated facts, are again doubtful as a consequence of Mummery's hypothesis. What is the significance of the odontoblasts sometimes included in the dentin? What is the *rôle* of the cells of the pulp situated beneath the odontoblasts, the significance of the so-much-discussed layer of Weil, etc.? It can be seen that there is no lack of problems to resolve, and nobody would dare to pretend that the solution is not connected with the process of the nutrition of the dentin.

The studies of the variations of nutrition under physiological influences comes next. It would be mere repetition to enumerate the various other problems the solution of which has yet to be found in experimentation and clinical observation.

Besides the speculative interest which this study or group of studies presents, it is also of practical importance. They are related with the physiological modifications of the habitat where most of the pathological affections we have to deal with are developed. If the importance of the physical or chemical properties of teeth was formerly highly exaggerated, it is also true that the contrary has also been exaggerated by certain other observers. Dental caries is of an infectious origin, and, as in all infections, there are two factors which can influence the lesions produced,—the condition of the tissues in which it is developed, and the micro-organisms. For a long time an exclusive influence has been attributed to the quality of the structure of teeth, to their more or less perfect calcification, etc. The great merit of Black, Williams, and Miller is that they called attention to the fact that the cause of caries should be looked for not only in the tooth, but also outside the tooth,—that is, in the oral surroundings, which serve as culture-media for the growth of micro-organisms. But in refusing to accord to the quality of the structure of the teeth the importance which we think it has, we think that Black and Williams went too far. The coefficient of resistance of teeth (Galippe), which depends on their chemical constitution, has to be taken into consideration. It is not, therefore, entirely useless to know exactly how it is modified under various physiological influences. When the conditions of the nutrition of the dentin shall be known we shall be in a position to bring about scientific prophylaxis of dental disturbances, and that *rôle* belongs to the dentist, who, in our opinion, should not limit himself to a narrow clinical field, as it is not true that dental diseases can be separated from the study of pathology; and we could then improve the therapeutics of those affections in regard to rational general treatment, selecting an appropriate remedy, or by local treatment, selecting filling-materials according to precise facts.

We have used for the writing of this article information taken from works of varying scientific value. We believe that although not every one can make histological, experimental, or bibliographical researches, yet there can be found in every observation facts useful to know.

Discussion.

Dr. FREY (president). After such continued and deserved applause to Dr. Tellier I would not consider my duty as fulfilled if I did not specially thank him for having written on the subject inscribed in the program. The author of the article in question worked hard in order to treat the subject under all its aspects and to express everything with clearness. Dr. Tellier's work is remarkably valuable; not only because it will now be possible to study this question by following his suggestions, but also because he has provided us with his very interesting personal contributions to the subject. We could never thank him enough for his communication.

I am very happy that the first and second Sections should be together, as it has given us the opportunity of hearing Dr. Tellier's communication, which deals with both the anatomy and the pathology of the tooth. His conclusions show us that the question of the etiology of dental caries has been asked, but has remained unanswered. We find on the one side Galippe's school, which takes into consideration the constitution of the tooth as a factor in the predisposition to this disease, while there is another which looks upon the chemistry of saliva as a factor in the etiology of caries. Galippe may be right, but that we do not know. It is probable that in the saliva there are certain conditions which permit the development of the microbes studied by Black and Williams, and which cause decay. I regret that it is a little late, because otherwise Dr. Michael's paper could have been read, and would have served as a complement to Dr. Tellier's article.

Dr. Roy. I would like to mention a point which is of less scientific importance, but that Dr. Tellier has nevertheless treated in his report. This is a very interesting point, which I will only mention in passing, because I had the intention of presenting to this Congress an article on this subject,—the influence of food on the nutrition of the dentin; and I think that this function of the nutritive materials is very important. If an animal is nourished with food deprived of calcium salts its teeth will suffer as a consequence, but in the conditions of general nutrition I believe that the chemical constitution of the food is not of great importance. What is of greater importance, on the contrary, is the mechanical resistance of the food-stuffs. This mechanical resistance acts in regard to the nutrition of dentin and to prophylaxis of caries in two ways. The first way is a purely prophylactic one; the resistance of the food brings about stronger mastication, a greater mechanical action, and in consequence a mechanical cleansing of the teeth, a very important thing in connection with the prophylaxis of caries. We know that in patients who are nourished with liquid food no mastication takes place, and caries develops with great rapidity, while, on the contrary, in persons nourished with solid food a mechanical cleansing takes place.

Besides the mechanical cleansing of the teeth, there is, I believe, in the resistance of solid food a considerable source of nutrition for the dental tissues in the following manner: The more resistant the food is the stronger must be the muscular effort to masticate it, and if this effort is continued the muscles become stronger. The dental muscles are better developed among uncivilized peoples than among the civilized, on account of the more frequent use which the savage races make of them. In ancient times men, like the other animals, considered their teeth as organs of defense. The stronger mastication is the greater will be the development of the muscles. The development of those muscles is accompanied by the development of the bones to which they are attached, and we know that the stronger the muscles are the greater will be the development of the bones they are attached to. Muscular development brings about osseous growth.

I cannot believe that the development of the maxilla has no effect in a direct way on the development and nutrition of the tooth. We know that the circulation of the teeth is in relation with the circulation of the jaws. In consequence, if the maxillæ are strongly developed, are resistant, and well-nourished, there are chances for the pulp and dentin to participate.

I have only touched on the subject of alimentation. I wish I had prepared a more complete presentation of the subject; nevertheless, it is an interesting one, and has been well discussed in Dr. Tellier's interesting article.

Dr. TELLIER. The mechanical insufficiency of the action of the teeth and the disorders which may follow have already been discussed. I found something in connection with this question in the reports of a congress, but without any graphic indications. I simply mention it, and I am very much pleased with Dr. Roy's observation.

SECTION III.—OPERATIVE DENTISTRY AND SPECIAL THERAPEUTICS.

The Section was called to order at 4.15 P.M. by its president, Dr. RICHARD-CHAUVIN, who gave the following address:

Before commencing the considerable work of this Section, allow me in the name of the members to welcome our foreign confrères as members of this great manifestation. I wish to congratulate my confrères Hern, Daboll, and Heitmüller, who have been nominated honorary presidents of this Section, a nomination which the Congress has unanimously applauded. It is a just mark of distinction that has been paid to our confrères, whose professional worth has been the guide in this selection. Section III is one of the largest, and, if I dare say it, one of the most interesting for the dentist; it is a truly professional one. The number of papers offered to the Section amounts to about thirty, among which we find those of Hern, Dill, Marcur, Rudolph Weiser, Quintin d'Argent, Trallero, Martin, Cunningham, Walkhoff, Hinkins, etc. These names are a true representation of the value of the communications addressed to this Section, and we must congratulate ourselves upon having in the Congress and in this Section the acme of the professional world.

Gentlemen, our task is to enlighten the conclusions reached by the authors of the communications. Order and system must reign in our sessions, otherwise all our discussions would be fruitless. We must work in conjunction with the other Sections of the technical group. Our time is very limited, hence the necessity of dividing it profitably. I will give the example of brevity, but before finishing my remarks permit me to welcome all the foreign dentists who have come to Paris to support us with their professional authority.

The president called upon Dr. RUDOLPH WEISER, Vienna, who read his paper, entitled

RESULTS OF THE RADICAL TREATMENT OF ALVEOLAR ABSCESS AND ROOT CYSTS WITH PRESERVATION OF THE TOOTH.

There are few departments of pathological histology in which such various doctrines have been taught up to the present time as in that of root cysts. On the one hand is the hypothesis of Magitôt, who, after various modifications, formulated the doctrine that the epithelium of the cyst originates from the epithelium of the dental follicle which persists upon the inner surface of the periosteum; on the other the "paradental theory" of Malassez, which teaches that dental remains of fetal structure present in the interior of the adult and normal jaw are responsible for the development of root cysts.

A whole series of authors is to be found partly in one and partly in the other of the above camps. Some try to occupy a middle ground; others attempt to advance a new view altogether, without, however, succeeding in accomplishing anything else than making "confusion worse confounded." At this stage an important paper by Von Brunn, "On the Extent of the Enamel-Organ and its Importance in the Formation of the Teeth," was published in the *Archiv für mikroskop. Anatomie*, 1887. The importance of this discovery, "that the enamel-organ extends not only so far as corresponds to the later enamel, but, proceeding beyond the limits of the enamel, it gradually covers the entire dental germ as far as the apex of the root," was, as J. Witzel remarks, first recognized by Partsch in his paper "Upon Root Cysts."

When, now, Dr. J. Witzel, in 1896, basing upon the researches of Von Brunn, Morgenstern, and the numerous ones made by himself, together with the rich material of older date largely collated and critically sifted, published his excellent work "Upon Root Cysts, their Origin, Cause, and Treatment," we experienced a sensation of relief in the conviction that the Gordian knot had now been cut. I have still a lively recollection of the pleasure experienced as I devoured Witzel's brochure, which had been sent me while spending my vacation in 1896 in my own Tusculum. All doubts in this much-contested field appeared to be solved; as indeed they are and will probably remain for all time as regards the origin of root cysts.

The situation is in no wise changed, even though Römer subsequently showed, basing upon interesting researches by himself, that granulomata also occur at the apices, which are entirely of connective-tissue origin and can hence never become root cysts, as they possess no epithelial elements; while Witzel believed that granulomata generally are to be regarded as cysts which have failed to reach complete development. But the case is otherwise with the clinical differential diagnosis *in vivo*. This, it is true, is better established as against odontoma, carcinoma, sarcoma, empyema of the antrum, acute abscess; but we are by no means able to differentiate very small root cysts from chronic alveolar abscess with certainty. As regards this point the practitioner must depend upon the history, with all its uncertainties.

Let me instance a few examples in support of my statement. We have to treat in a youthful subject an upper premolar presenting symptoms of a recent partial (non-purulent) pulpitis. The day following the application of arsenic (with the coffer-dam) the pulp is extracted with a Donaldson's needle, under antiseptic precautions; the pulp is removed *in toto*. We fill with antiseptic solution of gutta-percha and a point; gold or porcelain filling is then applied. This procedure of daily practice almost always gives an excellent result. Occasionally, however, we find that the tooth is useless for mastication, sensitive to pressure, somewhat loosened, otherwise troublesome and annoying to the patient. We reassure ourselves and the patient with the statement that a slight degree of periosteal irritation is present, which will subside spontaneously within from eight to fourteen days. And this usually happens, but exceptionally, and that in cases where it bothers us most, the unpleasant condition persists. Within ourselves we are hoping that at the end of some months, perhaps a year, an acute inflammation or an abscess may occur, and thus permit us to give rapid and certain relief. The torpid tooth favors neither us nor the patient in this way. Years ago, when I did not dare to conserve teeth like this, nor those with chronic abscess, by the help of the radical operation, I again and again had recourse to extraction because of such ill success. I found at the root either simply strongly injected blood-vessels, the periosteum somewhat thickened, or not rarely a tough nodule as large as a hemp-seed, which appeared to be fibrous tissue on section, but contained no pus. What had occurred? The acute beginning, the pain, and the loosening of the tooth, slight though both were, are, according to Witzel, symptoms which do not point to a cyst. And yet I believe that such forms are rather to be regarded as cysts originating at the apex in consequence of the slight traumatic irritation than as "pus sacs" or abscesses, infection being almost certainly excluded and no pus being present.

Another picture: Complicating a pulpitis granulosa, infection of the jaw takes place,—an acute abscess. We open the pulp-cavity, empty the pus through the root-canal. Subsidence of all symptoms. At the end of two to three days even, instead of pus a viscous, stringy, abundant fluid forms, which is poured in spurts into the root-canal as soon as the temporary filling is removed. Such teeth were formerly a knotty puzzle to me; later I did not wait long to learn whether the tooth or the peculiar abscess was going to yield. Inasmuch as a simple incision was, as a rule, totally inadequate, I excised a portion of the buccal wall of the abscess, and thus always obtained rapid and permanent cure, with conservation of the tooth or root.

Again, is not this extraordinary behavior of an abscess at the apex of a root, with nothing analogous elsewhere in the soft parts, but only to be paralleled perhaps in joints, in the pleura, pericardium, ovary, perhaps also in the testes, in short, wherever epithelial elements are present to play their *rôle?* These circumstances, in connection with other facts,—*e.g.,* the predisposition of the rheumatic and gouty to alveolar pyorrhea, together with the not-to-be-forgotten inferior mobility of the teeth during mastication,—have perhaps co-operated in creating, considering the manner of insertion of the teeth in the jaw, a special termination—gomphosis. But even more frequently do we meet with the following conditions: We desire to replace a filling of unknown insertion which has become defective. We remark the insensibility of the dentin, subsequently the fetid odor of the clearings, perhaps of the "underlying" cement. Finally we expose an empty pulp-chamber. We find no abnormality whatever in the alveolar process, and inquire of the patient as to repeated attacks of periostitis. He maintains, however, that the tooth has been painful only for a short time before filling, and not thereafter. Notwithstanding repeated disinfection, the packing continues to smell, and remains slightly moist. We practice forced injections after Smreker's method. The patient complains of violent pressure-pain within the jaw; we infer that a cavity is present at the apex, whence the root-canals are constantly reinfected. It is only after reaching and cleansing this cavity from the bucco-labial sinus and continued disinfectant after-treatment that we succeed quite promptly in effecting a cure. What had occurred here? The history by no means corresponds to what we have been taught to regard as the infallible symptoms of a cyst which has become septic, nor to the diagnosis of a chronic abscess.

Finally, another large group of cases is to be considered. A still youthful woman entreats us to give her final relief from a large upper molar (right or left) which has been repeatedly filled, often painful, and, especially before or after a ball, etc., occasions slight swelling of the cheek. She is most unwilling to lose the tooth for various reasons. We resist the temptation to find "no present indication to interfere" on conscientious grounds, and from the conviction that success is possible even in such cases by conservative treatment. We make an examination. The tooth contains a still solid filling, generally amalgam; no infiltration nor hemispherical swelling covered by normal mucous membrane is present upon the alveolar process. The tooth is not exactly loosened. If, however, we percuss the crown with an instrument, the finger of the other hand placed in the region of the root-apex experiences the fremitus characteristic of cavities in that situation (Smreker's sign). We remove the amalgam filling, and find what appears like a proper root-filling in the palatal canal; the probe brings up a fluid of slightly putrid odor out of the anterior parietal canal, which we will assume, as is generally the case, is empty; while from the posterior parietal canal spurts, upon removal of a clot from the opening, an astonishing quantity of a clear, stringy fluid. I ask again, what about the differential diagnosis? The history, the absence of swelling about the alveolus, the non-aseptic condition of the anterior root-canal, would all lead us to have suspected a chronic abscess rather than a cyst; while the diagnosis of the latter was based solely upon the presence of cystoid fluid, which fluid, moreover, is not rarely found in undoubted cases of acute abscess, cases which, as described above, we may trace from the very commencement. Even granting the undoubted truth of the dogma formulated by Witzel, that "a true root cyst never arises from an abscess," it must be admitted that the differential diagnosis between root cysts and chronic alveolar abscesses is often impossible to make with certainty during life and with the tooth in place (not extracted).

The principal problem having, however, been solved, the combined efforts of the histologists and clinicians will undoubtedly succeed in establishing the differential diagnosis for small cysts also,—for those cases where the characteristic swelling of the jaw has not yet taken place.

Let us turn again to a phase of the matter which is settled: *Teeth affected with root cysts or alveolar abscess in its different stages are not only susceptible to conservative treatment, but they offer even a quite certain prognosis for a safe and permanent cure.*

In order to present the subject as clearly and succinctly as possible, I shall consider it under two heads:

A. The treatment of large cysts and that of the tooth giving rise thereto.

B. The conservative treatment of teeth affected with small cysts or alveolar abscess.

In view of the difficulty or impossibility of the differential diagnosis above referred to between root cysts and alveolar abscesses, and because the treatment of cysts which do not exceed a bean in size is not different from that suitable in abscess, I shall treat the two forms together in the second part.

A. Ever since Professor C. Partsch published his ingenious method of treating larger root cysts no rational practitioner will probably employ any other operative technique than the one suggested by him, although the surgical treatment of root cysts had been successfully practiced for a long time; for the reason that, by his method, a large portion of the buccal protuberance of the cyst having been dissected away with scissors, the epithelial covering of the part seated upon the jaw is preserved, and union of this pavement epithelium with that of the adjacent oral mucous membrane is sought to be obtained by suitable after-treatment (washing the cavity with antiseptics and prolonged tamponing with iodoform gauze). This method remarkably shortens the time of healing. Large root cysts are relatively frequent in surgical clinics and dental schools; in private practice in large cities they are rather rare. In my practice of sixteen years as a dentist I have had to treat surgically but nine cysts, varying in size from that of a cherry to that of a pigeon's egg; three of these, of the hard palate, had to be opened. In five of the cases conservative treatment of the tooth was indicated, and yielded a successful result.

B. The great mass of operative cases of the jawbone in my experience were small cysts (from a hemp-seed to a bean in size) and alveolar abscesses. My method is not at all new.

Miller, in his "Lehrbuch der Conservierenden Zahnheilk.," states that Smith (Dental Cosmos, 1889, p. 792) was the first to practice amputation of a root-apex, in 1871. In January, 1891, I reported *in extenso* a case under the title, "Cure of a Cyst of the Jaw Communicating with the Antrum." In this case I treated conservatively the root of one cyst, which served as the point of departure for a second.

Smreker's commendable description of the proper technique and its recommendation in practice appeared next.

Since 1893 I have systematically practiced this little operation according to the indications to be given hereafter.

Moreover, Lodge (see Miller, *loc. cit.*) has described, in the *Ohio Dental Journal,* 1897, three modifications of the method of operation, and has also established the indications.

In the fall of 1899 I received the attractive and valuable "Fourth Report of the Polyclinic for Diseases of the Teeth and Mouth of the Dental Institute of the Royal University, Breslau." From this I gather that Partsch has been treating conservatively for more than four years, in the Breslau school, not alone large typical root cysts, as I was until then compelled to infer from his publication of the year 1892, but also small cysts and teeth affected with chronic alveolar abscess.

(a) *Technique of the Operation.*—The technical procedure as I have developed it for my purposes is as follows: After the root-canals have been cleansed of all detritus as thoroughly as possible at antecedent sittings, the diagnosis that a cavity exists about the apex is established from the condition of the disinfecting threads or the uniform ill-smelling odor present at each cleansing, or the continual moisture in spite of repeated packing, or the presence of a fistula. Forced injections with an air-tight Pravaz syringe (method of Smreker) of disinfecting fluids are attempted into the cavity, or through the fistula if one be present. If this is successful the diagnosis is rendered more certain; moreover, the healing process is very favorably influenced if it be possible, immediately following the operation, and for the ten days to three weeks required for the after-treatment, to irrigate the wound every third day from the root-canal with weak disinfecting solutions. In cases where these forced injections or subsequent irrigation of the wound with solutions are not successful, it is often possible to force bubbles of oxygen through the apical foramen. The oxygen is obtained by rapidly inserting in the root-canal threads moistened with pyrozone and dipped in sodium dioxid, and sealing the canals with Fletcher's artificial dentin. I practice injection of disinfecting fluids or bubbles of gas even before the operation; in the first place to further confirm the diagnosis; secondly, in order to prognosticate whether the after-treatment will take a more or less rapid and favorable course, and finally to have the field of operation as thoroughly disinfected as possible.

The instruments (knives, probes, excavators, etc.) are sterilized in boiling water and wrapped in cotton moistened with a one per cent. solution of mercuric chlorid. The mucous membrane is carefully disinfected and anesthetized by injections of cocain. A vertical incision from 1 to 1½ mm. in length, corresponding to the situation of the root-apex of the affected tooth (particularly high up in the case of the canine teeth, commencing in the region of the bucco-labial transition fold of the mucous membrane), is carried through the mucous membrane and periosteum down to the bone; a horizontal incision of the same depth and length is now made, crossing the former in the middle. The resulting four muco-periosteal flaps are detached from the bone by means of a small raspatory. The operator retracts two of the four flaps, together with the lip, with his left hand; the other two are kept out of the way by means of tenacula managed by an assistant. The operative field is now well in view, and an attempt is made to pierce the thinned corticalis with a short, stout knife, or a straight plugger with rounded tip is inserted in the fistula, if one happens to be present, and caused to penetrate the abscess; or, if these attempts fail, an opening is to be made into the bone in the direction of the root-apex with circular excavators, beginning with smaller and proceeding to larger ones, until the sudden cessation of resistance shows that the cavity has been entered. When this has been accomplished the dimensions of the cavity are determined by a probe or an excavator. The excavation is to be continued by means of excavators of increasing size, in order to destroy the softened granulation or the sac of the cyst, until an instrument is used whose diameter approaches as nearly as may be the largest diameter of the cavity within the bone. I have not rarely been forced to employ toward the conclusion of the process the well-known "Herbst root-trimmers." Occasionally the roots of healthy adjoining teeth, the alveoli of which it goes without saying are to be carefully spared, prevent our giving the route to the cavity the desired width. Healing takes place even in such cases, only the process is at times a somewhat lengthy one. Not at all rarely the abscess-cavities of two adjacent teeth or roots are confluent. In such cases the cleansing of both foci must be equally thorough. It is advisable to remove the thin partition of bone left between the two wounds, and to make a longitudinal and simple—*i.e.*, not winding—opening in the bone; the healing process is then capable of perfect observation, and may be influenced for good. *These are the very cases which give the most surprising, the most brilliant, results.* Teeth or roots which were suspiciously loose before or during the operation become remarkably firm during the healing process, and especially through the firm radial cicatrix. This, of course, is only to be expected in cases where the teeth corresponding to the lower third of the root are still embraced by a sound bony ring 4 to 10 mm. in width. As soon as the cleansing is completed the walls are to be irrigated from the root-canal. The operation will be the more successful in proportion to the width of the diameter of the stream emerging from the wound in the bone during irrigation from the root-canal. If a roughened root-apex is seen in the operation field or felt by the excavator, from 1 to 2 mm. thereof should be cut away. This is not at all necessary as a general rule; it is only in cases where I am led to suspect from the history that an apex has become a sequestrum of many years' duration that I even search for it directly (by enlarging the entrance to the cavity), removing it when found.

Finally, the wound is dressed for two or three days with a tampon of iodoform gauze. Every third day it is irrigated from the root-canal; the tampon is renewed two or three times, and later left out in the case of small wounds. I paint the edges of the wound, which are frequently irritable, with a ten per cent. solution of nitrate of silver; at a later stage I touch any exuberant granulations, if such are present, with the solid stick.

The pain of the entire procedure, as I know from personal experience (without cocain), is not very great,—not to be compared to that attending the excavation of a living tooth.

The time required for the operation varies in different cases from fifteen to thirty-five minutes, preparation, irrigation, and toilet included.

Reaction is most pronounced in the first two days, but comparatively light. Slight painless swelling of the affected half of the jaw, however, almost always occurs. This begins to subside on the third day. The reaction is more pronounced in the more serious operations upon the lower jaw; the latter are not without some risk. In all of my one hundred and nineteen cases upon the upper jaw the operation was completely successful, in the case of incisors and canines as well as premolars and molars.

Where the operation has been successfully accomplished the result is so certain that I begin even during the course of the after-treatment to make preparations for the building of a crown, when this is necessary, or to adapt the tooth for the support of a bridge. On three occasions, while operating upon the root-apex of premolars, and once upon that of the first upper molar, I accidentally entered the antrum. The subsequent course was, notwithstanding, quite normal, and without marked reaction upon the part of the antrum. In these cases I irrigated the antrum as well as the root-cavity immediately after the operation, to cleanse it of clotted blood, with a warm aqueous solution of one-half of one per cent. carbolic acid and one-half of one per cent. chlorid of sodium, in order to avoid irritating the mucous membrane of the antrum. I had occasion to practice the operation nine times upon the lower jaw, and in almost every case on account of acute or chronic abscess (with six successful results). In one case of root cyst, and in one of a small acute abscess, I failed, for the reason, as subsequent extraction of the tooth showed, that the excavator did not reach the apex, but the lower quarter of the root, of the affected premolar. Moreover, the operation succeeded in three cases involving the lower molars; also on one occasion I was compelled to resect the necrotic apex of a second lower premolar, employing for this purpose a dentate fissure-bur as a saw.

As above remarked, operations upon the lower jaw are decidedly more difficult, dangerous, and uncertain, because of the proximity of the canalis mandibularis. The reaction is somewhat more intense, nevertheless my results determine me to operate even in the case of the lower teeth upon all suitable cases, regard being had to all possible dangers.

(b) *Indications.*—I would name four indications for the procedure just detailed:

1. Chronic alveolar abscess.
2. Acute alveolar abscess.
3. Stubborn fistulæ.
4. Small root cysts.

1. Chronic non-fistulous abscess furnishes the most frequent indication for such operative treatment.

2. The procedure is frequently indicated even in acute alveolar

abscess, for the reasons (*a*) that it markedly shortens the course, especially where the focus of infection is deep-seated; (*b*) that it eliminates the danger that after premature union of a simple incision a chronic abscess may result, with tendency to subsequent acute outbreaks; and finally, (*c*) that the possibility of a fistula remaining is excluded.

3. I practice the operative treatment of alveolar abscesses in cases with fistula also, and that, too, whether the fistula be gingival or external; and with brilliant results in all cases where the history shows that there have been recurring abscesses, justifying the inference that decided changes have taken place in the jaw.

In this connection I would observe that from among a highly interesting collection of jaws belonging to Professor V. Metnitz, as well as from personal communications made me by colleagues Endlicher, Smreker, Breuer, Bodynski, and my own experience, cases are met where alveolar abscesses belonging to two, three, and even four separate teeth of one-half of the jaw are all connected with a single external fistula. Nay, it has even occurred that one abscess was seated upon the right half, a second upon the left half of the jaw, and both communicated with a single fistulous tract. I mention this to reduce *ad absurdum* those exaggerated statements which have been published wherein it is maintained that by this or that medical treatment every fistula can be cured "at a single sitting." In all cases in which the cotton packing does not become odorless after three or four forced irrigations through the root-canal, followed by an antiseptic packing, I proceed to the operative treatment of the alveolar process.

4. Root cysts varying in size from a hemp-seed to a bean are treated by the above method with perfect and permanent success, with preservation of the tooth. Root-apices are only to be resected in the relatively rare cases where they have become a roughened, generally black, sequestrum. Cysts which exceed the dimensions above given are best treated by Partsch's method, described in the July number of the *Deutsche Monatsschrift für Zahnheilk.*, 1892.

The application and proper execution of the operation just detailed cannot be too strongly urged upon the practical dentist. I may safely say that as regards myself and my patients, my career as a dentist divides into two epochs, that antecedent and that subsequent to my adoption of the radical treatment of alveolar abscesses and root cysts.

The operation is a real blessing to us dentists and to our patients, in that it offers us a method of banishing from our practice those turbulent cases which constantly keep us on the *qui vive*,—cases which love to disturb our vacations and worry our assistants. The more we have to do with gold contour and porcelain fillings, with crown- and bridge-work, the more indispensable for us is a procedure which places us in a position to really assure the results of conservative dentistry. Finally, I am unable to offer any testimony to the value of this procedure of greater worth than the word of a surgeon of the reputation and importance of Partsch, who says:

"It may be that the operation will seem a trivial one to many; to me it has been a source of great satisfaction, because of the gratitude of patients who have been freed by it of the discomfort of years and saved from a deformity which could be in some degree only compensated by prosthesis alone. I can most highly recommend it to the profession of dentists, and only hope that it will bring them the same satisfaction it has given me. At the same time it may serve to offer another proof that exact observation and knowledge will alone advance the art of therapeutics."

Discussion.

Dr. PONT. I thought that Dr. Weiser meant by radical treatment the amputation of the apex of the root. Dr. Martin (Lyons, France) proposed this treatment a long time ago, and you can find in the dental depots a trephine with which the diseased portion can be removed; the tooth could then be treated. But Dr. Martin himself had to abandon this method, which gave him bad results. The operation was performed in the following way: The length of the root was measured with an ordinary explorer, and its direction ascertained. The soft tissues were dissected, and the diseased portion of the root was removed. The tooth was then treated, and the canals were filled with cement, which was allowed to fill up the space produced by the amputation; after this the tissues were returned to place. This surgical treatment is not radical as far as consequences are concerned, and it takes at least one month before the wound is healed.

Dr. DUCOURNAU. And sometimes even more.

Dr. PONT. We must make a distinction in this question. It is certain that in cases of alveolar abscess the amputation of the root should not be performed; the medical treatment should be preferred to the surgical. This treatment should only be used in cases of chronic periostitis. In connection with the treatment of root cysts this method can be used, the amputation of the root can be made; but do we know if this treatment is better than the one that we use, —the formol treatment?

There are two kinds of cysts: one is as large as a hazel-nut, is readily diagnosed, and can be seen; the other is a cyst that is only seen after the tooth is extracted. When we have to treat visible cysts the treatment is different. The best way is to follow the same treatment as for caries of the fourth degree. The cyst is curetted, and antiseptic solutions are applied,—escharotic or simple tincture of iodin. Until recent years it was thought that root cysts were formed at the expense of the pericementum (Malassez and d'Avaran); that they were of the order of benign tumors that could become malignant, but that they were always classified as benign. Through clinical experiments we came to the conclusion that the histological researches were right in certain cases, as it must not be thought that all the cysts are formed from epithelium, for in the majority of cases we find an abscess-sac. The best proof is found in the cases that were observed in Dr. Poncet's clinic. The first symptoms are the same as the ones observed in the primary stage of alveolar abscess. These phenomena disappear little by little, and after one month, if the case is a favorable one, instead of an abscess we find a serous oily liquid, as in the case of root cyst. These are not considered to-day as being tumors; they are simple chronic alveolar abscesses.

I wanted to convince myself by means of histological examinations. I took several abscess-sacs; I examined them under the microscope, and from ten specimens that I examined I found epithelium in only one. I do not know how Dr. Marcel has found more. My researches were made in conjunction with Dr. Dor, chief of Dr. Poncet's clinic, and we were convinced that there was no epithelium; we were in consequence in the presence of chronic periostitis. Suppose that we should find a small cyst such as we generally find in teeth suffering from chronic periostitis; in such cases if we amputate the root we can cure the tooth, but the treatment is very long and cure is not always effected. In performing the operation the maxillary sinus may be opened, and a secondary inflammation may follow. I think—and this is my conclusion—that we should abandon the radical treatment, for it was abandoned by Dr. Martin, who devised this method, and who does not follow it any more. We should use the ordinary methods which are taught in the dental schools.

Dr. GROSS. I will here say something as to a root that I treated. The canals were very small, and the root was affected with apical pericementitis. I wanted to preserve this root, so as to be able to crown it, as it was the only diseased tooth, and the patient did not want to lose it. I prepared the canals as deeply as I could, thinking in this way to clean them mechanically. I also used antiseptic drugs, but I never obtained any satisfactory results, although I had cleaned the canals to the depth of one centimeter. I trephined the apex of the root with a bur, and I had during fifteen days an open wound that would not heal. At this time the patient asked me to extract the root. I had operated under very favorable conditions, and, as you see, the results were very unsatisfactory.

Dr. FENCHEL. These gentlemen think that Dr. Weiser and myself always perform the amputation of the root. That is not the case; we only want to bring to view the abscess, which is surrounded by tissues, and to treat it like an abscess on the skin. If we cannot cure an abscess through the tooth, this is the only way to treat it. That is why I think this method should not be abandoned, as it may be considered the last resource for saving a tooth.

The PRESIDENT. For all abscesses and pathological cases which are the result of carious infection and putrefactive infection of the pulp many methods of treatment have been devised. Some recommend one drug, some others, and it is my intention to present to you—not as a communication, but as a demonstration—the method which I use for the cure of all infected cavities in cystic or non-cystic teeth suffering from acute or chronic pericementitis. Very often one sitting is all that is necessary. I have given demonstrations in the dental schools where fistulæ were closed after one sitting. I think it is better to obtain this result after two or three sittings; it is better and less tiresome for the patient. The method is very simple; it consists in applying hot air to the root previously prepared for this treatment. I have had several witnesses who were afraid on observing the temperature to which I heated the air, but when they saw no painful reaction their distrust disappeared. I use a hot-air syringe with a platinum point, which I heat over a Bunsen burner. The platinum point is heated to a white heat, and is carried to the entrance of the canal. After the air is driven out of the bulb for a few times the dentin becomes desiccated, and it is possible to apply drugs, which are then readily absorbed through capillary attraction. The absence of pain through the entire thickness of the dentin is explained by the non-conductivity of the dentin, which is not a conductor of heat; in consequence the heat cannot be felt by the nervous tissue of the pericementum, for before the nerves of the pericementum are stimulated a certain time elapses, during which the tooth becomes warm enough, and no shock is produced. The experiment can be performed on the hand. This is a thing that I have often done when I practiced reimplantations. After closing the apical foramen the tooth is desiccated with hot air. The temperature is very high, the dentin at the entrance of the canal being entirely burned from the contact with the heated platinum point. Desiccation is obtained in this way, and drugs are rapidly absorbed.

I said a few moments ago that all this could be done in one sitting. We say one sitting, but, as the drying and heating of the canals is repeated after the removal of every dressing, it is evident that this sitting comprises several. It can be explained in this way why successful results are obtained after eight or ten days of treatment. There is nothing extraordinary about curing a tooth after eight days. The treatment consists in securing radical antisepsis from the first, and destroying not only the microbes, but also the poisonous matter existing in the cavity.

I will say, as a conclusion to my statements, that I will give a demonstration in one of the morning operative sessions.

Dr. SCHARD. Do you ever vaporize the preparations which you put in the canals?

The PRESIDENT. I am glad to answer your question. I consider that the medicaments should be applied after drying the canals, and not before. If you apply the medicament before drying the tooth it will vaporize under the hot-air current, and whenever we want the dentin to absorb a preparation the tooth should be thoroughly dried beforehand. In this way absorption is secured through capillarity. It is not possible to vaporize a medicament in cold tissues, so as to produce its subsequent absorption.

Dr. BROUSSILOVSKY. I had a similar case ten years ago. I thought the tooth could not be saved. The president of the dental school told me what to do, and it is to-day the only tooth which the patient has left.

The PRESIDENT. I am very glad that your observation confirms what I have said.

The president then called on Dr. FENCHEL to read his paper (of which an abstract is here given), entitled

DR. FENCHEL'S COMPENSATING AMALGAM: ITS COMPOSITION AND USE.

In 1898 Dr. Fenchel communicated to the Dental Society of Frankfort-on-Main the conclusions of a series of experiments on the contraction and expansion of different metals when amalgamated. A determination of the positive coefficients of the energy of those changes was the result of his work, which enabled the author to produce an unalterable amalgam in which he had scientifically compensated for the expansion and contraction of the different metals used. After a great number of experiments Dr. Fenchel succeeded by means of mixing three different alloys,—one that expanded, another that contracted a little, and a third that hardened very quickly.

Fillings made with this material require to be strongly condensed, and this must be done with rotary engine burnishers, just as in the Herbst system of condensing gold. Since the introduction of this alloy the experiments of Dr. Friedmann, of Hameln, made at the request of the Dental Society of Lower Saxony to determine the quality of fifty-eight different alloys, have proved the precision of the conclusions of the author, declaring the compensation amalgam of Fenchel superior to all other alloys.

The author invites his professional brethren to try his alloys, and begs them to communicate to him the results of their operations, favorable or not, as he believes that it is possible to obtain an ideal filling-material through the contribution of those confrères who criticize and take pains to observe the method of using and the results obtained.

Discussion.

A MEMBER. What is the composition of the alloy?

Dr. FENCHEL. I have not given it because when I first prepared my amalgam my confrères of Hamburg had the habit of asking me for some of it. I prepared them small quantities, but after that they began to ask for great quantities. They went as far as asking for three hundred ounces at a time; in consequence I could not give them any more, and to-day I sell it.

Dr. DUCOURNAU. Do you want to give us the composition of your amalgam?

Dr. FENCHEL. Oh, yes; I will give it in my next article. I will give the composition and quantities.

The PRESIDENT. It is understood, then, that Dr. Fenchel will give us the composition of his amalgam.

SECTION IV.—GENERAL AND LOCAL ANESTHESIA.

The Section was called to order at 4.30 P.M. by President RONNET, who made the following address:

Gentlemen: Before opening Section IV of the International Dental Congress I have to thank you for the honor you have paid to me in nominating me president of this Section. It is an honor the importance of which I highly appreciate. You may be convinced that I will do everything possible to deserve the selection that you have made. I am happy to welcome my foreign confrères, and to tender to them the assurance of my fraternal sympathy. You have come together to discuss a science which is of great interest to humanity, its purpose being to suppress pain.

Without going into the details of the history of anesthesia, I shall nevertheless remind you that it is to a dentist that we owe the discovery and the basis of this science, and it is the duty of our corporation to extend its limits in order to follow the footsteps of our confrère, Horace Wells, to whose memory I pay due homage.

We have to study the anesthetics not only in connection with extractions, but also in relation to all the operations the dentist may be called upon to perform. The effects obtained with different general and local anesthetics are above all praise, but human science can always be perfected; this is why we have to double our activity. Our problems are both important and interesting. I am sorry that the communication of our very distinguished confrère Dudley-Buxton, of London, will not be read. He nevertheless gives us hope that he may send it to us in time for its publication in the reports of the Congress. The case is the same with Dr. Darin.

I will ask you to pay special attention to the articles of our confrères Pinet and Jeny on general anesthesia with ethyl chlorid. This new method seems to have great prospects. Local anesthesia will be largely discussed, and the work of our confrère Jeny on the suppression of sensitivity of the pulp will surely be of much interest to all. The question of the analgesia of dental tissues by means of cataphoresis will be a subject of discussion. The reports of our distinguished confrère Dr. Pont are very interesting, and I would advise you all to follow the discussion which surely will be the consequence of such an important work. You will have not only interesting articles, but also practical demonstrations of the different methods advised. General and local anesthesia will be the principal subjects discussed, in order to see if it is possible to point out the progress accomplished up to date.

We hope that the work of Section IV of the International Dental Congress of Paris will be of much help to modern surgery, and will contribute toward the suppression of pain.

The President. Unfortunately, we have very little on our literary program. There is only one confrère who will read a communication. I hope that some of you will act as interpreters, and will take up the discussion.

Dr. Jeay (secretary of the Section). The article that the president has reference to is the one by M. Cladera, Madrid, on "The Application of Local Anesthetics." This paper will not be read, as Dr. Cladera is not present.

The President. The next thing in order is a paper by Dr. V. Hamonet, entitled "Improved Glass Syringes."

Dr. V. Hamonet then read the following paper:

Improved Glass Syringes.

The glass syringe (body and piston) is aseptically the ideal syringe, but it has the great inconvenience of easy breakage, allowing the needle to separate from the body of the syringe during the course of an injection. It is a syringe of difficult manipulation, the fingers being unable to find suitable support in order to use the force required for injections in dense tissues. All these inconveniences are eliminated with the little appliance that I have the pleasure of submitting to your consideration. This appliance has the great advantage of controlling the penetration of the liquid injected. This appliance, easily sterilized, envelops the body of the syringe. It is composed of a metallic band to which two slightly curved bars are fixed, which serve as a support for the fingers. Under these two bars two metallic plates and wires are attached. The wires surround the body of the syringe (in figure-of-eight). These two steel wires are soldered to another band at the end of the syringe; to this band the needle is adapted. There is also another band, which presses against the body of the syringe and which prevents the glass body from sliding. The distance between the two bands is so arranged that the pressure of the fingers is always against the little band which supports the needle. It is through this arrangement that this appliance has the advantages while doing away with the inconveniences of glass syringes.

This appliance prevents the escape of liquid from the syringe. It is possible to hold the body of the syringe between two fingers, and to inject the liquid with ease. The springs between the bands regulate the pressure of the piston, and the penetration of the liquid is less painful to the patient. The syringe is not easily broken. In certain glass syringes the liquid escapes between the piston and the body of the syringe. This inconvenience can be prevented by applying vaselin to the piston. It also has the advantage that very thin needles can be used. These are easily introduced in the tissues, do not cause any pain, and the liquid is forced out with less rapidity.

It is my opinion that for the majority of operations in the buccal cavity a curved needle following an angle of 30° should be used. In order to have the advantage of this kind of needles in the posterior part of the mouth, as, for instance, in cases of operations on the third molars, a little tube of about four centimeters should be inserted between the body of the syringe and one of those curved needles; in such a case the easy introduction of a long needle is obtained.

Discussion.

Dr. d'Argent. I wish to make two observations on ordinary syringes, and one on the particular syringe of Dr. Hamonet, as I have observed that this last one has not removed all the inconveniences which are found in the syringes at present in use. I do not want to criticize Dr. Hamonet's system; I think it very ingenious and capable of rendering valuable service. First I will speak in regard to the curved bars which serve as fulcrums to the index and middle fingers when pushing the piston into the body of the syringe. I have made several experiments in this connection, which have given me the following result: That, contrarily to what seems to be logic, the bars should be curved in a different direction. (The speaker here demonstrated this on the blackboard.) This seems strange, although it is more convenient. If the bars are straight and we have to inject into resistant tissues we hurt our fingers, but when the bars are curved upward the operator's fingers are never hurt.

I do not agree with Dr. Hamonet in regard to his needle curved to an angle of 30°. In very resistant tissues the force in injecting the liquid weakens the soldered points, and the force used in injecting is greater the more curved the needle is. I think that straight injections reach the tissues just as well as curved ones. The escape of liquid, which so often happens, is due to the inclined direction of the injection. This is a general criticism which does not affect this syringe in particular; it is intended for all syringes.

Dr. HAMONET. Dr. d'Argent says that the escape caused by the curved needle is due to the force used in the mouth, but when the needle is supported by a band like this that cannot take place.

Dr. D'ARGENT. The point of escape that I have reference to is not at the junction of the needle with the syringe, but at the soldered points. Solder is rigid, and is easily cracked.

Dr. HAMONET. How do you do it then?

Dr. D'ARGENT. I use straight needles. I am making a criticism of the curved needles generally employed. I prefer the straight ones.

Dr. HAMONET. The escape from a syringe like this is impossible.

Dr. D'ARGENT. I have said that my criticism is general, and that I consider your system as being very ingenious.

The PRESIDENT. In order to make a *résumé* of the discussion I will say that this syringe is a very ingenious one, and I congratulate Dr. Hamonet upon his good results. I will nevertheless say something in regard to curved needles, in which I have never found any advantage. In regard to the soldering, Dr. d'Argent is right; what he has pointed out often takes place in practice. I would be glad if the essayist would tell us in which cases he has found it advantageous to use the curved syringe.

Dr. HAMONET. Principally in cases of lower third molars.

The PRESIDENT. I would like to hear something in regard to favorable cases for the use of the curved needle.

Dr. HAMONET. When the injection is made on a level with the mucous membrane the insensitivity is greater. This curved needle is always introduced to a uniform depth.

The PRESIDENT. You can do the same thing with a straight needle.

Dr. HAMONET. It is difficult to follow a straight line in a curved surface.

The PRESIDENT. You can always find a place where the straight needle can be introduced.

Dr. HINJEAN. I use both the curved and the straight needles. I use the straight needles for the front and the curved ones for third molars. I do not think that either straight or curved needles should be used exclusively. I think that both can be used.

The PRESIDENT. There is a thing that we should not forget, and that is that in practice we acquire habits, and evidently the one that uses straight needles will use them for every operation. As far as my own opinion is concerned, I have no preference for any particular kind. Further experience will tell us which kind is the best.

Adjourned.

SECTION V.—PROSTHETIC DENTISTRY, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

The Section was called to order at 4.15 P.M. by the president, Dr. Martinier.

Dr. MARTINIER, after thanking the members for the honor which they had conferred upon him in electing him as president of the Section, said:

Prosthetic dentistry occupies an important position in our art. Since the time when it originated in France it has received contributions from all countries, and it can be said that during the last century prosthesis has been the branch to which the most attention has been paid. Nevertheless, though in actual practice it develops more and more every day, it seems that its importance is diminishing in the studies of schools and elsewhere. What proves the importance of prosthetic dentistry is the great number of confrères, prominent members of the profession in all countries, who are registered in this Section and who will take part in its work.

Prosthetic dentistry has expanded so much, its field is so large, that it could be subdivided into sections. Prosthetic dentistry must always be united to odontology, where it must occupy a prominent position. We can affirm, without exaggeration, that nine-tenths of the operations of our practice are within the province of prosthesis. It is not even possible to determine in a precise way where prosthetic dentistry begins, and the appliances which will be presented by our friend and confrère Dr. Michaels will show us that it is difficult to state where it ends. A great number of operations considered as belonging to operative dentistry have some connection with prosthetic dentistry.

Without pretending, as many confrères do, that the resection of a portion of a tooth and its restoration by a substance or a metal constitutes a prosthetic operation, we nevertheless recognize that we daily perform a series of little operations whose *modus operandi* belongs to prosthetic dentistry. Let us state as an example porcelain fillings, which require such accurate impression of the cavities; or crown- and bridge-work,—are they not operations belonging to prosthetic dentistry?

As you all know, our technique embraces a great number of operations where the dentist must display a great deal of care and ability; nevertheless it is remarkable how little attention the new generation pays to this branch of dentistry. It is very discouraging to see the little interest of our students in these studies, which they consider as being of minor importance, while we on the contrary recognize the necessity of having a good practical training, principally when we consider that the mechanics of to-day require manual skill and constant ingenuity of the highest grade. Where does this indifference and negligence originate? It is not, as we might believe, because prosthetic dentistry is not very remunerative, it is rather the contrary; all dentists perform prosthetic operations, even those that pretend to specialize themselves in the diseases of the mouth, and it can be said that even in this specialty the majority of operations are of prosthetic character. The cause can be attributed to the idea of our students who think that mechanical dentistry is divided in two parts, that done about the chair and which they perform in the best way they can, and that which is left to the skill of an able mechanic. They think that manual work should only belong to the group of artisans called mechanical dentists. If they would only ask for the opinion of our most prominent men they would learn that the construction of a prosthetic piece requires as much science as manual ability. It is not necessary to argue very much in order to demonstrate the erroneous ideas of our students. Appliances must be made in the operating room as well as in the laboratory, as for instance crowns, bridges, and metal plates where the different portions have to be tried separately before the final soldering. There are also two other and very important reasons. One is the difficulty of studying mechanical dentistry on account of the great amount of knowledge required, and the other is on account of the very slight importance which the state examinations attach to this branch. The difficulty of studying this branch is a known fact. The mechanical dentist must have a good knowledge, not only of the materials and metals that he uses, but also of the mechanism of lathes, etc., he must know the latest and most approved methods. The making of mechanical appliances is related to grinding, modeling, swaging, adjustment, and polishing; and when familiarity with these is acquired there must also be the knowledge of how to apply them to the different branches of prosthetic dentistry, each of which requires special study.

Prosthetic dentistry, with its great variety of cases, with the difficulty of selecting from the great number of methods, with the constant progress of the technique and instruments, is leading us rapidly to the continuous-gum methods which oblige us to have a detailed knowledge of ceramic art. Also the numerous combinations of crowns and bridges, which at the beginning did not attract us very much, but which we now recognize as having true advantages and which we try to perfect in order to preserve the features of our patients.

Orthodontia, that science whose problems require so much work and imagination, puts two methods into action,—the rapid one, requiring all the knowledge and skill of a dental surgeon, and the other one requiring all the patience and knowledge of a true mechanical dentist. We have among us in this Congress prominent men who have worked according to both the methods, and who will demonstrate to us their particular advantages. Buccal and peri-buccal prosthesis comprises study, investigation, and an ability of a peculiar order. The immediate prosthesis of the maxillæ is a part of mechanical dentistry which can justly be called French prosthesis, as we are indebted to the works of a Frenchman for our knowledge on this branch.

Lastly the paradental surgical prosthesis, whose value you will appreciate through the appliances of Michaels. This special branch of prosthesis, in conjunction with that of the jaws, makes of the dentist an indispensable help to the surgeon.

The diversity of these prosthetic methods suggests the idea that the extended medical knowledge imposed upon the dentist, and which is so seldom applied in our surgical and dental operations, is absolutely necessary for the combination and adaptation of the appliance whose construction nevertheless requires that the practitioner should be a skillful mechanic. We all agree in recognizing that the program of medical studies is too extensive and takes too much of the time of the student at the expense of his technical studies, principally of prosthesis. The variety and the great number of medical lectures and clinics do not allow us to form the practitioners that we would desire; the practical work required is not in relation with the importance which it must have in the teachings and practice of our profession. The difference in the standard of dental education is an obstacle to the unification of our teachings. Some students have some knowledge of mechanical dentistry before entering the school and can rapidly progress during the three years of study, while others (the doctors of medicine), who only spend one year in the school, ignore the most rudimentary principles of mechanical dentistry, and disturb the course of the work inscribed in the program of the third year.

The remedy for this condition of things would be found, according to my opinion, by using an entire year, say the first year, for the study of prosthetic dentistry. This course could be theoretical and practical. The teaching in the laboratory could be carried on by means of typical models, and of a series of operations carefully selected which would compel the students to acquire methodically and progressively the amount of knowledge necessary in order to continue their dental studies and improve their knowledge of prosthetic dentistry during the following years. May be that it would be convenient, in order to encourage the students, to ask the dental schools to create every year at the end of the course a competitive examination, open to first-year students, on the works of the first-year program. The students obtaining the highest marks could be rewarded by allowing them to follow the studies of the third year free of all charges.

The clinical teaching of mechanical dentistry, which is the logical conclusion and the indispensable complement of the laboratory work, must be extended. It is not enough if the student knows how to construct a plate; it is necessary that he should know all the operations preliminary and complementary to the construction of appliances. Daily demonstrations on the patients, several weekly clinics (at least three) which the students would be required to attend, are absolutely indispensable. We should also look for the welfare of the mechanical dentists, and as the teaching of these students is very defective we could admit them to the laboratories for a certain period of time. This group of men would be a valuable help to the dentist. We will point out the obstacles for carrying out this program.

For the clinical instruction in mechanical dentistry a considerable number of patients are necessary, which would require the buying of a great quantity of expensive materials. This manufacture of dental appliances in the school is a detriment to many dentists. This is a very delicate point, and it is to us that belongs the task of improving this condition. It may be that, in regard to mechanical dentistry and orthodontia, phantom appliances would offer an economical way of replacing certain common cases. Something could be done in this respect. This is a very important consideration, and it should be the object of our immediate concern; and I beg the members of this Section to work on this line in order to reach a favorable solution of this very important question. I think that if the members of this Section, the majority of whom are authorities in their respective countries, enjoying an incontestable influence, would use this authority and influence for the service of this cause we should surely arrive at results which would become epochs in the history of our profession.

I think that I have performed my duty by sounding this pessimistic note in this meeting. I think that the interests of all the members are related to this question. It is absolutely necessary to create a new generation of technical men, who shall be skillful in all the branches of our art. I invite you to present to this Section resolutions on this subject which, when examined by the Commission and after that by the General Assembly, will serve as a basis for the reformation of teaching methods. We will have performed in such a case a useful work, one which will help toward increasing the value of the Third International Dental Congress.

Dr. WM. BOOTH PEARSALL, Dublin, Ireland, then read his paper entitled "Brittle Platinum Pins in Porcelain Teeth."*

Dr. L. VICHOT, Angers, then read his paper entitled

CONTRIBUTION TO THE STUDY OF THE MODIFICATIONS BROUGHT ABOUT IN THE BONES OF THE FACE AS THE RESULT OF THE CORRECTION OF DENTAL IRREGULARITIES.

The possibility of modifying the bones of the face has, during recent years, been the subject of interesting researches and communications, and it is even now a subject for discussion, although it is no longer possible to deny the results obtained, which have been proved by the numerous cases now on record.

One of the most frequent instances, and the one mostly discussed, is the case of forward projection of the superior maxilla. In such cases, if the projection is great, there is always an elevation of the anterior external portion of the maxilla, and hence the production of a deformity which it is necessary to correct. As a support to this theory I will communicate to you the case of an individual who presented a marked projection of the superior maxilla with pronounced elongation of the incisors; all this complicated with retroversion of the lower incisors. On account of this state of things the mouth was always open, the upper lip leaving the incisors exposed; they were separated from the labial surfaces of the lower incisors by a distance of one centimeter and a half. The consequence of these different abnormalities is a facial deformity giving to the person a very peculiar aspect.

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*Printed in full at page 1135 of this issue.

The patient, a girl, nineteen years of age, of normal constitution, had adenoid vegetations besides the maxillary deformity. Heredity had manifested itself in this case, as the mother and sister present the same abnormalities, but in less degree. The patient had difficulty in pronouncing certain letters on account of the conformation of the palate, which was flattened in its anterior portion. The intelligence of the patient was highly developed.

We decided to begin immediate treatment, as we thought that we had only just the time needed, as the upper third molars were ready to erupt and would exercise forward pressure, which would result in an increase of the deformity. After raising the bite by means of crowns placed on the first upper molars and left there for four months, we extracted the first bicuspids, which were decayed, and in this way we secured the space necessary for pushing backward all the anterior teeth. To reach this end we decided to use, slightly modified, the appliance devised by Martinier.

First, the anterior metallic cap covered the four incisors, and was carried externally as far as the gingivo-labial groove, embracing in this way all the external wall of the maxilla, which was pushed backward when the proper forces were applied.

Second, the external gingival bands of the palatal plate were also carried to the gingivo-labial groove, in order that the inserting points of the rubber bands should be placed in such a manner that the force could be directed from before backward, and also upward.

Four months afterward the teeth occupied a normal position, and the external wall of the maxilla had been lowered to the point of complete occlusion. A retaining appliance was then applied.

To correct the irregularities of the lower jaw we utilized the elastic properties of piano-wire. We made an appliance composed of a swaged plate, to be adapted to the lingual face of the incisors and to the internal surface of the maxilla as low as it was possible to carry it. On this plate is fixed the curve of a spring, whose extremities rest at the level of the molars on a rubber plate covering the internal surface of the jaw. This plate has V-shaped spaces cut into its anterior portion, in order to allow free action to the spring.

In two months, and through this appliance, we pushed forward the incisors and the portion of the jaw supporting them. To-day—that is, in less than a year after the beginning of the treatment—the articulation is normal, and our patient has greatly improved physically.

The anterior external maxillary portion has been lowered in this way, allowing the patient to bring the lips into close contact, a thing which had been impossible for her to do before the beginning of the treatment. The hard palate has undergone marked changes, which have transformed its conformation. The four incisors, which were too long, are now of the length of their neighbors, through the progressive upward motion obtained simultaneously with the correction of the prognathism.

This case is not by any means a new one; it is only the repetition of similar cases already described on different occasions; but it proves once more that bony modifications can be obtained in the mouth and face through the use of appropriate appliances, and without the use of an extra-buccal appliance, which cannot be worn all the time, and which to many patients is intolerable. In the present case we would have never obtained the same rapid results with an appliance having its supporting points outside of the mouth, because in such a case it could have been used only at night. Our patient, being employed in an office, could not have worn such an appliance, which could only be imposed upon a child, and even then it should be simplified as much as possible, as a troublesome appliance tends to discourage the child, who only wants to get rid of what troubles him. It is also through the perseverance of older patients that we obtain sometimes more rapid results than in children, notwithstanding the less appropriate physiological conditions.

The retaining appliances should be worn for a long time; the age of the patient and the importance of the irregularity should guide the operator in respect to this matter. I have a patient, a young girl, on whom I performed a regulating operation which was not very difficult. After three months I supposed that it was time to remove the retaining appliances. Now, this young person was in a period of rapid development, and two months after the removal of the retaining appliances the teeth began to move to their abnormal position.

I leave it to you to deduce the necessary conclusions, as I did not have any time to prepare them.

Discussion.

A MEMBER. It would have been quite interesting to see the appliances used, and the models of the mouth after the irregularity had been corrected. These questions interest me very much. It has been impossible for me to see the appliance.

Dr. VICHOT. Dr. Martinier's appliance has not been modified by me. I did not think it necessary to bring it with me.

The PRESIDENT. Dr. Vichot will show us photographs.

A MEMBER. I think that there is a little bar between the central incisors.

The PRESIDENT. It is simply a crown which covers the incisors. You can make two; I only make one. Externally, there is a hook, to which the rubber band is attached.

Dr. VICHOT. The crowns are put on the molars in order to raise the bite; they can also be put on the bicuspids.

A MEMBER. Do not the crowned teeth become loose after a certain time?

Dr. VICHOT. Never.

A Member. Do not these teeth return to their original position?

Dr. Vichot. Never.

A Member. I had a case where the lower incisors returned to their original position, and began to strike against the upper ones.

Dr. Vichot. You first crown the molars, and after the appliances are removed the teeth continue to elongate.

A Member. But in the meanwhile do not the upper incisors return to their original position?

A Member. Yes.

Dr. Roy. I would like to say a few words about the considerable importance of raising the bite. I am convinced that in that kind of regulating cases the raising of the bite is in many cases all that is necessary, principally in cases where the irregularity is due to a projection of the upper jaw. In young subjects the raising of the bite would be enough to correct the irregularity. I wish to emphasize the importance of this operation, for if the teeth are regulated following another system they will probably return to their original position.

Dr. Siffre. I agree with Dr. Roy, but a difference should be made between projection of the upper teeth when in contact with the lower, in which case it is necessary to raise the bite, and projection of the same teeth when not in contact with the lower, in which cases it is not necessary to raise the bite. The operation of raising the bite is in many cases all that is necessary to correct the irregularity. I had a patient fourteen years old for whom I extracted the upper first bicuspids and made appliances to maintain the posterior teeth in their natural positions. I secured in this way satisfactory results. If nothing abnormal occurs during the operation the retaining appliances are not necessary. If the lower teeth have a tendency to strike against the upper a retaining appliance should not be used, but, on the contrary, the lower teeth should be corrected.

I heard Dr. Vichot saying that the retaining appliances could be removed after three months, because consolidation of tissues should have been completed by that time. I should like him to explain how this takes place. This is a question that has not been treated scientifically. The conditions in an adult are not the same as in a child ten years old. If there is nothing that will prevent the tooth from remaining in the position to which it was moved it will stay.

Dr. Roy. I should like to know the age of the patient.

Dr. Vichot. Nineteen years.

Dr. Roy. Some time ago I regulated the teeth of a young lady of twenty-six years. I used the ordinary methods, and the results were very successful. I used platinum wire to retain the teeth. Did you use rubber bands?

Dr. Vichot. Yes.

Dr. Roy. In order to work with greater rapidity I made an opening on the jaw. I obtained in this way very good results. No inflammation followed the operation. I point out this operation because I wish to know if others of my confrères have been successful in using this method.

Dr. Vichot. I agree with Drs. Roy and Siffre in regard to the importance of correcting the bite in cases of slight irregularity, but this depends principally on the extent of the irregularity and on the articulation of the teeth. In the case in question I had to raise the bite. If my only purpose had been to correct the upper irregularity I would not have needed to raise the bite, but I also wanted to correct the abnormal position of the lower jaw.

There is a fact that has been mentioned by Drs. Roy and Siffre in regard to the articulation, and it is that if the teeth while in their new positions are constantly disturbed by some fault in the articulation the retaining appliances will be of no use. They can be left on the teeth, but as soon as they are removed the teeth return to their abnormal positions. Now, in regard to that case, where the teeth returned to their old position after they had been retained during three months, I will say that I did not take into consideration the development of the person. The patient was a girl thirteen years old. The position of one of the incisor teeth was slightly irregular. No tooth, either upper or lower, was pressing against it. I thought that it was not necessary to leave the retaining appliances for a very long time, but a month after they were removed the teeth returned to their old positions. What was the cause? I do not know. I have only pointed out that this young girl was in a period of rapid development, greater than that of other girls of the same age.

Now, I think that I have said enough in regard to the objections raised against the present case. I have spoken of the results that can be obtained from the use of intra-buccal appliances. The extra-buccal appliances are very troublesome for children, and the irregularity is not corrected with any greater rapidity.

The President. Before the discussion is closed I would like to make a few remarks.

Dr. Roy is right in pointing out the importance of raising the bite. This refers not only to the correction of irregularities in the upper jaw, but to all kinds of irregularities. In many cases the irregularity of teeth is caused by some defect in the articulation. Now, when the bite is raised you change the existing irregularity; not only in this case, but in a great number of others. I will present to the Congress a case where it was not necessary to raise the bite. The teeth occupied normal position, except in regard to occlusion, only the molars coming in contact. I had nevertheless the same results as my friend Dr. Vichot. I did not have to watch the articulation, but I had to put in retaining appliances. Heredity is sometimes apparent in regulating operations; in some cases the retaining appliances have to remain longer than in others.

Dr. Siffre has spoken about the influence of muscular force. I do not agree with him. I think this influence may be possible in a very few quite simple cases. In the last case seen by Dr. Siffre, and which I will show you, you will see that even if the bicuspids are not present the muscular influence would not be of any consequence.

Certain appliances require strong anchorage on the cranium.

Our confrère has been very fortunate in getting good results from a patient twenty-six years old. This proves that in many cases it is possible to regulate the teeth of persons of this age, or even older. Dr. Angle's appliance is a very good one, and I believe that whenever this appliance is used it gives very good results. But young girls are very difficult, and will not tolerate the head-piece. This is one of the hardest things in our practice,—I mean the intolerance of our patients, and the ideas of their parents that their children are undergoing terrible sufferings. Did that young girl wear the head-piece? Did she have to wear it day and night?

Dr. SMITH. During the night.

The PRESIDENT. Simplicity must be the dream of the dentist, and this applies directly to this kind of appliances. I have very often seen children who refused to stand the pressure of the appliance.

Dr. SMITH. An older patient will be worried by wearing this appliance.

The PRESIDENT. This is what I wanted to say: That person supported the appliance very well; underwent an operation in the jaw. These are things that we cannot always compass. I am glad of the results obtained, as it proves that to the age of twenty-six or later teeth can be regulated and excellent results obtained.

Dr. RABEC said that a woman does everything to improve her looks, and mentioned the case of a young lady who had acquired habits on account of the irregularity of her front teeth. She would not look straight in the face of the person with whom she conversed, and even when she laughed she hid her face with her hand. She wished to have this irregularity corrected. She had been under the care of two dentists, who began to correct the irregularity by means of rubber bands and wooden wedges. He selected the Angle system. He considered that certainly the first thing to do was to find the cause of this irregularity. He discovered that this person had adenoid vegetations, which obstructed her breathing. The vegetations are hereditary. He made a slight modification of Angle's appliance, which is composed of two bands fixed by means of screws and nuts; through these a metallic wire is inserted. This holds the teeth, and serves as a point upon which the force is supported. In the ordinary method the bands are removed after the regulation is completed, but Dr. Rabec did not remove them; he left them as a retaining appliance. He asked if this method has been used.

The PRESIDENT. I do not agree with certain statements made by Dr. Rabec. In regard to the adenoid vegetations, I would not say positively, but I think that you go too far by stating that they are the cause of maxillary deformities. Adenoid vegetations are not always hereditary.

I come now to the case which we are discussing; I mean the extraction that you made.

A MEMBER. It is not an extraction.

The PRESIDENT. I understood that you had extracted one of the bicuspids, and that you resected the alveolar border. Our confrère is the first one to resect a portion of the alveolar border in order to correct the irregularity with greater rapidity. He must have been sure of a success, because at twenty-six years the teeth offer a greater resistance.

You used Angle's appliance, which has the small inconvenience of not having any plates, but only bands. There are two appliances, an external and an internal; this is why the appliance does not need any plates. If you would apply an intra-buccal appliance the six molars would change their positions. The complication of regulating operations is generally due to the use of too great a force at the beginning of the operation.

A thing that must be taken into consideration above any other is the age of the patient; yours was twenty-six years. In a general way it is better if the operation is done at fifteen or sixteen years.

You took a big external anchorage. I think that the same results can be obtained with an intra-buccal appliance, of which I will show a very complete collection.

Dr. Rabec. The work has to be done with great care. I began with one rubber band, and at the end of the operation I used two, three, and at last six.

The President. Progressively?

Dr. Rabec. That patient was a very patient one.

A Member. I have made many regulating operations, and I recommend the use of Angle's appliance whenever possible. The person has to be very patient, for it is painful to put the appliance in its position, and in the case I have reference to I did not succeed in placing it where I wanted it. In two cases where I was very successful, the patients being twenty-three and twenty-seven, they used the external appliance only during the night. It is a very troublesome thing; it prevents the patient from sleeping. I nevertheless recommend this appliance. To be successful in this kind of regulating operations it is necessary that the molars should serve as anchorage to move the front teeth backward, and if they are used for this purpose they will probably move.

The President. Even normally.

A Member. If the Angle appliance is used during the night it will push backward the molar which during the day moved forward.

A Member. I will tell you about a case where the teeth were formerly very regular. Before I left for the Congress a gentleman told me that he had in former years very regular teeth, but, as he was constantly holding a pipe between his teeth, his articulation had become entirely changed; the lower teeth had been pushed forward, and the upper ones backward. I can show you the models. I brought them with me to ask your opinion on what could be done to remedy this condition.

A Member. He should cease smoking the pipe.

A Member. He has ceased to smoke a pipe for two years, and no improvement has been noticed. He cannot close his mouth.

SECTION VII.—(*a*) HISTORY OF DENTAL ART; DENTAL MUSEUMS. (*b*) LEGISLATION, JURISPRUDENCE, AND DEONTOLOGY.

The Section was called to order at 4.15 P.M. by the president, Florestan Aguilar, Madrid, assisted by Dr. Lemerle, Paris.

Dr. LEMERLE. Gentlemen: Before our honorary president opens the Section allow me to address you a few words in regard to the communications belonging to this Section. The history of dental art, deontology, professional jurisprudence, etc., are the questions that will be discussed. Our questions are not, properly speaking, on scientific topics; are they on this account of less interest to us? Far from that. It is probable that these questions can be discussed to advantage in this kind of assemblies. In fact a question on pathology or therapeutics can be controlled, but the same is not the case with questions on deontology and jurisprudence; for, in order to establish or modify the professional code, which I believe ought to be an international one, we need general discussions where the opinion of all countries can be represented. These debates will show the progress of our profession as well as its desiderata. We will prove to the dental world that there is no American or English, or German or French dentistry; we are simply dentists working for a common cause,—for the progress of dentistry.

One more word, in regard to the history of dentistry. It has been said that happy people have no history; it may be the same could be said of societies and professional associations. But it is not to dentistry that this can be applied. History tells us that we were not happy. The physicians have always practiced the art of treating teeth, and during the past centuries we were oppressed and undervalued by them. This is certainly one of the causes of the slowness with which dentistry has progressed. Several of our colleagues will discuss the mysterious past of our profession. They will treat this question under different phases. We shall especially note the slow progress of our profession when we consider that dentistry is as old as humanity.

Following the address of the president,

Dr. G. MARION, Paris, read a paper (of which a *résumé* follows) entitled

A STUDY OF THE BEST MEANS OF SUPPRESSING CHARLATANRY.

What is charlatanry? Charlatanry is the act of defrauding the public by means of false dissertations and acquiring its confidence in order to realize pecuniary profits.

Dr. Marion described the different means used by charlatans,—luxury of furniture, display of all kinds of diplomas. He said that the language and actions of a charlatan are employed solely for the purpose of defrauding the public.

The education of the public is progressing daily, and as a consequence the street charlatan has had to abandon his street dissertation and public gestures as advertising schemes. It has been said that advertising is the soul of business, but we are not convinced of this fact. The advertising methods of to-day are the most perfect manifestation of sophistication and fraud. We do not condemn commercial advertisements, but we do condemn those individuals who advertise for their goods qualities which they do not possess. If we consider commercial advertisements we will see that in this case there is a relative display of honesty, for the seller exhibits his goods and the buyer examines them before the transaction takes place. This is by no means the case in medicine, dentistry, or pharmacy.

Dr. Marion condemned in an absolute manner all kinds of advertisements connected with dentistry. Not only does he condemn this kind of advertisement, but also the publicity that should be given to the matter in order to suppress charlatanry; for the public, which is in absolute ignorance of the matter, would not know how to differentiate the honest practitioner from the charlatan. He said that the only way to stop charlatanry is by means of educating the public, what he speaks of as special education of the public. It is naturally unnecessary to write books on anatomy, pathology, dental therapeutics, and mechanical dentistry for the use of the public. We must explain to our patients the dangers of a defective operation, the consequences which may follow the use of ill-fitting appliances; and when they know that all the claims of the charlatans are frauds, then they will appreciate the advantage of being treated by an honest practitioner.

What we intend to do cannot be accomplished in a day, but, thanks to active and honest minds, it is possible that these notions will eventually penetrate into the brain of the public. Professional associations have become so popular that we can say that in all the countries of the world dentists are grouped in scientific associations. The principles of the by-laws of these associations are all the same. In the United States the societies have adopted and follow the Code of Dental Ethics.

After having read a French translation of the American Code of Dental Ethics, the essayist proposed the following conclusions:

First. That the universal federation of dental societies should adopt the following Code of Ethics:

Section I. The dentist must be just and honest toward his patients.

Section II. The same spirit of justice and honesty should prevail in the relations between dentists.

Section III. It is against professional honor to publicly advertise, using circulars for the purpose of attracting the attention of the public to special operative methods, to the fees charged, and to a pretended superiority over other confrères.

The publication of professional success, of certificates, the sale and use of secret preparations, are against the principles of the Code of Dental Ethics.

Section IV. The publication of the name and address of the practitioner, of changes in address, of departures and arrivals, and in fact all true information, professional cards with name and address, are not considered against the principles of the Code of Dental Ethics.

Second. The federation of professional societies will nominate a commission, composed of the delegates of all the countries adopting the code. This commission will see that the Code of Ethics is followed in the countries where it is adopted.

Third. There should be formed, in every country, a committee of delegates of all the professional societies. Every delegation would have to insure the observance of the principles of the Code of Dental Ethics in his corresponding jurisdiction.

Discussion.

Dr. MONNIN. The public charlatan, the one that advertises in the daily papers, the one that sends out circulars, is not as dangerous as the one who practices charlatanry under different forms of hypocrisy. It is possible to become a charlatan through charity work. It is one of the ways of entering society; you do not advertise, but as soon as the public confidence is gained you work for your personal account. The public does not now believe the claims of advertisements; their value is known, and everybody is aware of the fact that teeth are not indestructible. I believe that the best way to fight charlatanry is by recurring to the public authorities. You can find in every city a dentist respected by the community; he could receive the title of dental surgeon of the municipality. He would be the official delegate, and would visit the public schools and would inform the children's families of the treatment necessary, and would also point out the defective work. The result of this system would be the education of the child.

Dr. LEMAIRE. Allow me to tell you that you are out of the limits of the question. Your discussion is on hygiene.

Dr. MONNIN. I know it, but this would be my method of suppressing charlatanry.

Dr. MARION. I want to call the attention of Dr. Monnin to what I said before in regard to the difficulties in differentiating the charlatan. We know people who would use the title, proposed by Dr. Monnin to distinguish the honorable practitioner, as a means to defraud the public. I do not think that the education to which Dr. Monnin refers should be given in school; children do not remember the suffering they have gone through, but when the individual is older he reasons and he remembers if the plate does not fit well or if the other operations are not satisfactory. He will think and educate his own children.

After a few more remarks by Dr. Marion, on the measures to be taken by each particular country, the discussion was closed.

Dr. CH. CHARPENTIER then read a paper (of which the following is an abstract) entitled

UTILITY OF MUSEUMS FOR THE TEACHING OF DENTAL ART.

There are museums of all kinds, but all have the same purpose,—the preservation and exhibition of objects connected with the history of humanity.

The one who knows learns all the time; the one who does not know learns how to learn. The things that we see every day are co-ordinate in our memories. How does this co-ordination take place? By looking at and touching the objects which surround us. The child learns the form of objects, their color, their degree of heat, by using them and touching them constantly. For him nature is the object of his daily training and education. The same is the case with us; when we undertake the study of a new subject we need to see those things which must become engraved in our minds, we must see them and we must feel them, not once and twice, but ten and twenty times, if necessary, in order to co-ordinate what we wish to learn. Now, if we need to see things, if we must touch them, what could we find better than museums which contain the means of knowledge and the efforts of human energy. It is through the museums that we can keep records of the past.

Dentistry has a history, a present, and a future. Museums are needed places where all the knowledge required in dentistry should be gathered together. The museum should help, and should act as complement in the teaching of dentistry. It serves for students the purpose of a daily teacher.

Dr. Charpentier gave a long dissertation on the usefulness of dental museums, and said they ought to be placed in such a position as to be constantly seen by the students. He explained the advantage of illustrating lectures by means of appropriate models, charts, and objects.

In our profession everything is experimental, everything has to be examined and investigated. Human anatomy, comparative anatomy, general and special pathology, therapeutics, mechanical and operative dentistry have to be taught by means of experimental methods. When they asked Dèscartes where his library was, history tells us that he answered by raising a curtain where a body that he was dissecting could be seen. He then said, "I learn in the book of nature." This is a simple and great truth. The experimental method of teaching is the best, and it is this one that we have to use in our special teaching, which is altogether a practical one. We need models, charts, and all kinds of specimens; in consequence it is absolutely necessary that we should have museums in which all these things can be examined and studied.

Human and comparative anatomy, principally that part which treats of the head, should be taught by means of appropriate specimens. A beginner must have a fair knowledge of the teeth, and in no way can this be better accomplished than by using big models made of plaster or papier-maché. Diseases of the oral cavity, congenital deformities, are taught in the clinics; in these cases patients are the true subjects of study, but there are certain very rare diseases that are seen in the clinic but once or twice. Models representing these conditions should form part of the museum, so that in case these patients could not be had at the clinic the students could be referred to the specimens in the museums. General and special pathology and bacteriology could be better studied by these practical means, What is here said in regard to pathology applies also to operative and mechanical dentistry. These two subjects are taught in the laboratories and clinics. Natural teeth with prepared cavities and sections of teeth would be of great utility for our dental students. A longitudinal section of a tooth will show them the exact position of the pulp-chamber; another the position of the canals.

The essayist referred to the advantage of models in connection with the preparation of cavities for cement, amalgam, soft and cohesive gold, the making of bridges, of partial plates with clasps, etc. The existence of museums is of advantage not only to students, but also to practitioners, as the dentist of to-day has to be familiar with all the new methods and improvements. He can visit the museums and realize the progress made; he can compare the old methods with the new.

In conclusion he said that all dental schools should possess museums where the members of the profession could send interesting, rare, or even common specimens.

Discussion.

The PRESIDENT. This question does not need to be discussed, as no one doubts the utility of museums. Dr. Charpentier has pointed out the importance of museums containing not only old specimens, but also new ones; places where the students can go and examine everything relating to dentistry. We have done everything in order to attain this purpose in the Ecole Dentaire. All the specimens which compose the museum do not belong to the school, some belong to the museums of Vienna, Stockholm, etc., and some to the other museums of France.

Dr. MARION. I will ask that all the practitioners who write books or articles, who describe new methods, or who do anything that can be of some interest to the students, should send to the dental schools such specimens as can be used for the purpose of teaching.

This demand of Dr. Marion was unanimously accepted by the members of this Section.

Adjourned at 5.15 P.M.

SECTION VIII.—HYGIENE AND PUBLIC DENTAL SERVICES.

The president, Dr. POINSOT, in his opening address, spoke in substance as follows:

Gentlemen, as you all know, we represent the Section on Hygiene and Public Dental Services. You will observe how simple is the definition of the words, hygiene and public dental services, but you will also notice their importance.

"Hygiene" means the conservation of species, it is the pathway to improvement and perfection. The dentists are among those that do not improve; a state of degeneracy becomes every day more accentuated upon us. It is already time that the study of hygiene should be of some profit to us. Our work, our desires to be useful to humanity, give us marked results, but we suffer the consequences of that constant strain. Some use up their energy and spend their fortunes. All these produce results which, although good, are not homogeneous; they are more satisfactory in one sense than in another.

Now let me speak of public dental services. This is a highly interesting question. Dental services comprise a great many things. The dentist should fulfill his duties in every respect. Ambition is not the only factor in the accomplishment of a certain end, sometimes faith and conscience play important rôles. There are moments in life when discouragement prevails and it is at this time that the organism requires a stimulus. We should be able to render great services to humanity by means of hygiene and public dental services. We should act in such a way as to deserve the thanks of society, and our constant aim should be the improvement of our species and the cessation of suffering.

Dr. Poinsot then read his communication entitled

The Creation and Operation of the Dental Service of the Asylum of St. Anne.

Many observations of serious changes in the mouth coinciding with cerebral and nervous changes, and followed by the patient's entrance to the asylum, induced me in 1884 to consult Dr. Bouchereau, physician of the asylum of St. Anne.

I learned, to my great surprise, that this question was a new one, and that there were reasons for undertaking a serious investigation.

An examination of the mouths of the patients of this doctor's service revealed a number of pathological cases.

In the presence of such a discovery I was asked by Dr. Bouchereau to organize a dental service for the asylum, and to begin immediately to render this service gratuitously while waiting for its official organization.

The organization of this service was asked of the General Council in 1884. The bill was passed, but the Commission d'Assistance of the Department of the Seine did not accept it.

Charitable service was continued, and the petition renewed in 1885, with the same result. We continued, nevertheless, in our function until 1891, when the service was officially organized. In 1892 a dental service of external consultation for the poor people of Paris was added. These people generally suffer from mental and nervous diseases. Since that time all the asylums of the Department of the Seine have had dental service attached to them.

Results Obtained.—During the later years we have registered about twenty-five hundred patients with an average of three thousand dental operations.

Confrères, students of dental and medical schools, and doctors of medicine have come to honor us and to help us with their charitable services.

During these sixteen years of special studies the conviction of our initial observations has been confirmed. This is the reason why all the members of our profession should, for the good of humanity, investigate and study this question.

Changes in the dental system precedent to the entrance of patients to the asylum called our attention and made us begin the study of this question, and the changes that I have observed during the performance of my functions have reinforced my conviction that the dentist's services could be used for the diagnosis, prognosis, and therapeutics of many nervous and mental diseases.

The asylum of St. Anne, however, has no monopoly of the dental changes we are going to deal with; in private practice similar cases are not rare. In fact, it is easy to notice the relation between dental changes such as we see in our offices and the character or aptitudes of the persons under our care. Through this study we see that dental disorders have their corresponding physical changes.

Physical Disorders of Dentition.—The physical disorders of dentition are caused by nutritive disorders of two opposite kinds: One through excess, the other through insufficiency or arrest of general nutrition. In the first case we will have hypercementosis, with compression of the neighboring nervous filaments, as in alcoholism. Equally as well this same accident can become complicated through auto-infection, as in syphilis aggravated from the effects of specific treatment.

In the case of insufficiency, and even arrest of nutrition, we will observe the slow but sure evolution leading to mortification of the pulp and the accidents of auto-infection which follow. The seriousness of the phenomena will depend on the length of the roots, and also on the general state of the patient before the beginning of the disorder.

Excess of nutrition will be diagnosed through percussion, the resistance being above the physiological average.

The insufficiency of nutrition, in opposition to the above condition, will be manifested by a state of mobility more or less pronounced in proportion to the seriousness and rapidity of the infectious process. The sound obtained is dull, and contrasts with the one in the opposite condition.

The color of the teeth is also of importance. The tooth presents a color resembling that of a very ripe fruit in the case of exaggerated nutrition, and a less brilliant and dark gray color a certain time after the beginning of defective nutrition. There can also be observed above the region of the affected teeth chronic fistulous tracts. These fistulæ are less dangerous when they open in the vestibule of the mouth, but in teeth with long roots they follow a deep course. They intoxicate surely and rapidly, and penetrate easily into the neighboring sinuses and into the vascular tracts, just as the inoculation of cadaveric alkaloids causes sometimes unexplainable sudden death.

Teeth of this kind are more numerous than might be supposed, and, although the majority among them do not show any alteration of surface, some of them are attacked with caries of the second degree, which is the original cause in this kind of changes.

These changes are sometimes of great benefit to the patients, because caries may reach the pulp-chamber, whose exposure would prevent any septic accumulation.

This exposure is facilitated through the pulp-chamber, whose size is in proportion to the age of the patient at the time of the trophic troubles. This opening of the pulp-chamber prevents the phenomenon of auto-infection and of the splitting of the tooth.

Sometimes the teeth are irregular. The most diseased ones are elongated and displaced from their anatomical position. This is on account of the absence of antagonizing teeth, or on account of insufficient development of the maxilla, sometimes through a lack of proper direction during the replacement of the deciduous teeth by the permanent ones.

Alveolo-dental arthritis is frequently found, and the mucous membrane of the mouth is often in a condition of chronic congestion, with or without pathological exudations.

The general medical practitioner is called upon to treat the accidents following such a condition of things, which the patient describes as having so many and various symptoms as to be likened to many disorders, embracing the greater part of the pathological nomenclature. These patients are called arthritic-neuropathic.

Nevertheless, the specialist is asked to give particular treatment; we mean the oculist, the otologist, the laryngologist, who contribute to oppose the consequences of dental changes upon the organs of their province.

A more serious study of the intellectual disorders obliges us to study the childhood of the patient. In fact, it is common to observe in the child susceptible to the changes we are dealing with modifications of his emotional nature, and we observe apathy, irritability, unreasonable anger, difficulty of learning through lack or diminution of memory, and morbid commotions. It is principally during the eruption of the first permanent molar that these phenomena occur with greater intensity.

In school the child is considered among the number of bad boys, and is subject to punishments which irritate and aggravate his moral and physical conditions. This takes place principally in individuals the conformation of whose jaws offer obstacles for the eruption of the second permanent molar.

These same disturbances are found in the abnormal evolution of the third molar, principally in the lower jaw. These accidents are sometimes dangerous, and seem to be becoming worse from the effects of our anti-physiological civilization. These same phenomena take place in adult age, where the pathological effects of psychical excitements, of the struggle for life, of the ambitions produced by a real or supposed intellectual superiority (of normal or demented character) are the same.

During old age general and dental pathological disturbances are more dangerous on account of the lessened resistance of the debilitated organs. It is principally at that age that our services are solicited.

Process of Death of the Tooth.—The mortification of teeth is generally caused by trophic troubles, which are symptomatic of nervous disorders. This condition is found in herpes zoster, in malum perforans pedis (a tropho-neurotic disease of the sole of the foot), in Raynaud's disease, in mental disorders, in tabes dorsalis (locomotor ataxia), etc.

The arrest in the nutrition of the dental pulp, due to disorders consequent to insufficient nutrition, causes the mortification of the pulp and an arrest in the calcification of the tooth, stopping dental development, and later on causing the mortification and infection of the alveolo-dental articulation, suppressing the external life of the tooth; dental abnormalities follow, and favor the conditions of nervous and mental degeneration.

Importance of Intelligence upon this Subject.—The prophylactic treatment should be directed toward the education of the patient. This should be kind, serious, and just. The child should be given an appropriate moral treatment.

Physical treatment—open-air exercise, good food, hygienic care of the mouth. The dentist should examine the mouth principally to correct any abnormal eruption.

Through social and individual relations we can easily complete the diagnosis of the suspected condition. In fact, during childhood many of these patients make their teachers desperate, and are punished, a thing that would not be done if the origin of the fault was known.

It is very desirable that the surgeons of the army should be requested to make a report to the military authorities on the condition of the mouths and teeth in order to establish the responsibility of the men accused of offenses. In the civil courts the medico-legal experts ought to take this same measure for the sake of justice.

In private life it is also equally important that such a serious disorder should not be unknown, because many things are tolerated from the sick which should not be if the person was supposed to be in good health.

The ignorance of these disorders brings about family misunderstandings, separations, and even divorces.

It would hence be against the truth to pretend that all insane cases are in asylums or sanitariums. There are cases on record where the patients have learned through study to avoid any public manifestation of their condition.

Through the examination of the mouth of a patient, at liberty or not, we can recognize or deduce his physiological, psychological, or pathological conditions, and, in consultation with the physician, we can prescribe the required therapeutic treatment.

As much as it is good to diminish the existing evil, still better would it be to prevent it from taking place. To reach this end the physician and the dentist ought to work together for the benefit of the patient. From the time of the disorders of the first dentition until the evolution of the third molars how many interesting phenomena could be observed, and how much attention and care are required; and, nevertheless, these are things that are not thought of.

The normal development of the jaw is a very important factor; otherwise the teeth take irregular positions, and this can be in many cases the cause of serious nervous and cerebral disorders. The development of children does not take place any more according to physiological principles. The child has to go through many studies which are becoming harder every day; he constantly lives between the lessons he has to learn and the exercise he has to write. He is threatened with punishments, which consist sometimes in increasing his scholastic work, already difficult for him to keep up with. This continuous state of fear is a potent obstacle for the development of his jaws, and in consequence for the regular disposition of his teeth, and facilitates the extension of his cerebral and nervous disorders.

It is principally during the evolution of the third molars that the most serious accidents occur, and it is wonderful that many families are not dishonored at the time that this phenomenon takes place, since the persons thus suffering are irresponsible for their actions.

Among the active classes we observe that exhaustion takes the place of fatigue; a man is more sensitive to the things that interest him. This is why commotions in this kind of persons can sometimes have very serious consequences.

The victims of psychical causes can be recognized by the examination of pathological teeth, principally when the cause of these disorders takes place before the advanced calcification of the pulp-chamber. Something should be deduced when an examination of the mouth reveals the absence of certain teeth, as it may be that those teeth were extracted for therapeutic reasons.

I could mention many cases that would demonstrate the irresponsibility of many patients in whose mouths can be found teeth dead from trophic causes, but professional secrecy obliges us to be reserved on this very delicate matter.

Therapeutics.—Our treatment for nervous and insane patients will be of two kinds,—psychical and therapeutic. Psychical treatment first because patients of this kind expect sympathy in their troubles. Whether patients are old or young, it is convenient to endure even their unkind remarks and to act toward them in the most unyielding manner.

The condition of certain patients is sometimes not even suspected by their families. The family should be notified in a very reserved manner, asking them if the patient is not sometimes in an irritable humor. The answer is generally an affirmative one. This is the opportunity to tell them that the patient requires special treatment, and that it is better not to be so severe with a person so little responsible for his actions. Generally the family takes, after this warning, a very kind attitude, and the patient also improves.

In order to use our special therapeutics it is necessary to be familiar with dental deontology. Nothing is more disagreeable than to notice the professional errors that we commit daily. In fact, we have to be sincere and confess that errors in diagnosis have caused us to confound cases of simple caries of the second degree with those of the second degree of trophic causes. These are things which greatly favor the production of accidents like those of which we are speaking.

We shall have to reproach ourselves for not having educated our patients or their parents with the purpose of informing them of the risks they are running.

Examination of the mouth begins generally at the occurrence of the replacement of the temporary teeth by the permanent ones. Our advice could be useful before that time, as we believe that the lactation period is sometimes too short and sometimes too long; in fact, it is common to see the Arabian woman in Algeria nursing her children until the age of three and even four. This difference in the lactation period predisposes the organism to a faulty development, principally of the maxillary bones.

We will have to occupy ourselves with the children at the time the permanent teeth replace the temporary ones, taking care to observe the time of the replacement, avoiding early extractions, which might be the cause of the beginning of irregularities and the consequences resulting therefrom. To avoid these consequences it is convenient to preserve carious teeth by means of appropriate treatment until the time of their replacement, except when the diseased teeth are the cause of serious complications; in which case the attention bestowed upon them should be doubled in order to help nature by means of appropriate appliances used at the right time.

The selection of food is a very important thing for the development of the jaws, for the regularity of the teeth, and for the composition of its structure. Nutritious food should be given. It should be hard and resistant, and should require strong mastication. In such cases caries would occur very rarely, and the first and second molars would erupt normally. The same would be the case with the third molars if our advice were followed.

Unfortunately, our intervention is not preventive. This is why we should intervene in pathological cases, where rapid treatment is necessary. In those incompletely developed mouths, if the disorders are of a serious nature, it is convenient to secure space through judicious extraction. The rhinologist may be called upon when atresia exists that is due to the presence of adenoid tumors or polypi in the respiratory passages, in which case the development of the jaws will be obtained, and with the help of regulating appliances the teeth may be made to take their anatomical positions.

In nervous people at the time of the eruption of the teeth it is important to guard against septic accidents and to prevent complications, sometimes serious, by means of strict antiseptic treatment of the mouth.

The mouths of insane and nervous individuals should be in good condition; salivary calculi should be removed as soon as formed; gingivitis cured; digestion of all the food ingested should take place; little liquid should be taken during meals; dental changes should be treated according to the rules of dental art, and gutta-percha should be used in preference to all other filling-materials. Dead teeth and roots should be extracted. The same should be the case with teeth in senile condition, acquired or anticipated, resulting from old age, alcoholism, syphilis, or from those troubles caused by exaggerated nutrition.

It will be necessary to replace the teeth that are absent, so as to insure mastication and to keep the remaining teeth in their proper places.

Prosthetic appliances will prevent the lowering of the jaw, a thing which is of great importance for our patients.

Discussion.

Dr. Bonnard. The very interesting communication of Dr. Poinsot proves the importance of creating dental services in hospitals, and in particular in insane asylums. Statistics clearly demonstrate that many nervous disturbances have decreased after the treatment of diseased teeth, which are the cause of a constant irritation which increases the seriousness of the nervous disturbance. It is due to the service created by Dr. Poinsot that such a great number of improvements have been realized. Our mission is to establish dental services wherever they do not exist, and to generalize the principles of hygiene. Dr. Poinsot has given us an example. He has pointed out that in the different stages of this type of diseases improvement can be brought about by the treatment of diseased teeth. Certain nervous patients had their attacks increased on account of the pathological condition of their teeth. We should do our utmost in order to establish similar services. In this way we will render services to dentistry; we will increase our knowledge, and we will relieve the poor beings who ignore the origin of their troubles.

Discussion closed.

Dr. Verluysen, Antwerp, was then called on by the president to read his paper entitled

Dental Inspection of Schools.

The dental inspection of the public schools and of the kindergartens of the city of Antwerp was organized a year and a half ago, and is in charge of two graduate dentists. The inspection takes place three times a year. At every visit the dentists examine all the children, with special attention to those that the teachers regard as having the most defective teeth. Their attention is specially directed to the cases of abnormal dentition. Those patients which require immediate attention are taken to the office. The services rendered to children consist of extractions, dressings, relief of odontalgia, etc., but never any prosthetic operation. Every four months, at the end of a complete period of visits, each dentist sends a report to the Director of Public Instruction, detailing the observations and operations performed.

This can be considered as a description of the organization of the dental service in the schools of the city of Antwerp:

The population of the schools on March 31 of this year was as follows: Girls, 9543; boys, 10,148; kindergarten, 4778; total, 24,469 children. The kindergartens are frequented by children from three to six years; in the other schools the age varies between six and sixteen years.

Caries.—Out of 12,000 children that I examined I found 1721 without caries, 2138 with one or two decayed teeth, and 8141 with many decayed teeth.

During the first inspection 947 extractions were performed: In the upper jaw, 458; in the lower jaw, 489; total, 947. On the right side, 477; on the left side, 470; total, 947.

At the second inspection 545 teeth were extracted, and at the third 405, which makes a total of 1897 teeth, the majority being of the deciduous set. When necessity requires I sacrifice the teeth of the first dentition, just as I would do with those of the permanent one, believing that those organs (the deciduous teeth) are not exactly *noli me tangere*. We try to avoid injuring the germs of the permanent organs, and extract, we wish to repeat, only in case of necessity.

From the statistics of the first inspection it results—

1. That in the lower jaw the number of diseased teeth found is greater than in the upper.

2. There is a strong disproportion between the anterior and the posterior teeth. The number of incisors, canines, and bicuspids extracted during the first inspection was 261, while the molars extracted were 686.

3. A comparison of the anterior teeth of the upper and lower jaws gives the following result: Central incisors—upper, 31; lower, 7. Lateral incisors—upper, 60; lower, 44. Canines—upper, 50; lower, 23. First molar—upper, 31; lower, 8. Second molar—upper, 5; lower, 2.

4. A comparison between the upper and lower molars gives us: First molar—upper, 145; lower, 174. Second molar—upper, 136; lower, 231. I have not made any difference between teeth of the first and second dentition, thinking that the reading of such statistics might become a tiresome subject for this honorable assembly. Those statistics are similar to those that have been published in recent years. That is—

5. Those teeth that are constantly bathed in saliva are the ones upon which the less number of extractions are performed.

6. Sex makes no material difference.

7. There are great differences in susceptibility to disease in the different teeth: Central incisors, 7; second molar, 231.

Dental Abnormalities.—The frequency of dental irregularities is in the following order: Upper lateral incisors, first molars, central incisors, canines, second bicuspids, first deciduous molars, lower incisors.

The upper permanent canines take generally an abnormal position. They are generally turned forward, which gives the child a very disagreeable appearance. In such cases I have made sixty extractions of the first or second temporary molars, principally of the first. I never touch the canine, and the result is very good; and I can affirm that in my schools I have not a single child with anteversion of the canines.

Regarding abnormalities of position, I have observed (1) five cases of transposition between canines and bicuspids and between laterals and canines; (2) six cases of eruption outside of the arch, one case where the tooth was in the canine fossa, three where the tooth was in the roof of the mouth, and two cases where the teeth were at the level of the genial tubercles.

In regard to abnormalities of structure I will only mention erosions: First came one first permanent molar, next the incisors, and then the canines. The variety most frequently found is the one in which the surface of the teeth is full of pits. We also found the notched variety and the Hutchinson tooth, the etiology of which is so much discussed. Teeth of this kind have a notched or furrowed condition of the free edge of the central incisors,—of nearly exclusively the upper jaw. I have never found this notched condition on the temporary teeth, neither on any other teeth than the central incisors. Out of twelve very typical cases of Hutchinson teeth that I observed seven were probably due to eclampsia, one was due to syphilis, and in the other four the cause was unknown.

I will speak of the operations performed during the term of inspection. We performed four reimplantations, seven implantations, and five transplantations. Out of the four reimplantations two were performed after resecting the periosteal cyst at the apex, one as a consequence of accidental extraction, and the fourth on account of traumatism. Seven implantations were performed; the cause was congenital absence of the teeth. The teeth implanted were two upper central incisors, two upper lateral incisors, two upper temporary molars, and one upper canine. The five transplantations were heteroplastic. They comprised two upper central incisors, an upper canine, and two first temporary molars.

Among these sixteen cases of reimplantation, implantation, and transplantation six were unsuccessful. The teeth had to be extracted some time after on account of the disorders they had provoked. For the other case we will have to wait in order to judge the results. In the implantation and transplantation cases the pulp was removed and the canals filled. This same course was followed in the case of the periosteal cysts, as well as in the traumatic cases. In the different cases the teeth were splinted by means of ligatures, by rubber dam, or by rubber appliances.

In the case of heteroplastic transplantation it is necessary to make a conscientious examination of the tooth, as it is possible to inoculate tuberculosis, syphilis, and other contagious diseases. Syphilis has been inoculated for preventive purposes; also smallpox. It has been tried to transmit cancer for experimental purposes. A piece of spleen of a typhoid patient has been ingested to see if Eberth's bacillus could be found. In a clinic a uterus was perforated without any reason, and for the purpose merely of proving that when an operation was performed under aseptic conditions there was absolutely no danger of fatal results. All these practices should not be approved. I believe that we do not go so far when we perform the operations of heteroplastic transplantation after a thorough examination of the tooth and its origin. This small operation is easy if we use anesthesia, local or general; it is not a dangerous operation for patient or operator. This is not always the case in general surgery, especially in abdominal surgery, where sometimes the most careful and able men forget a sponge or a clamp in the abdomen of the patient.

Disturbances of the Antrum.—Notwithstanding the great number of cases examined, I have only found two cases of inflammation of the sinus. The extraction of the offending tooth was all that was necessary to relieve the condition; this was probably on account of the small size of the antrum.

Facial Phlebitis.—Of the four cases observed, three were due to the lateral incisor and one to the canine. The antiseptic treatment after the operation was all that was necessary.

Luxation.—There was a single case of forward luxation, the cause being unknown. We should remember that certain individuals dislocate their jaws from very slight causes. The luxation was reduced according to scientific procedures.

Exanthematous Necrosis.—I have been able to observe twenty-six of this kind of necrosis, as follows: From scarlet fever, fifteen; measles, three; smallpox, one; diphtheria, one; six cases of unknown cause. In some cases I removed the sequestrum, in others I could only follow the ravages of the disease.

Noma.—Two cases. Antiseptic treatment; recovery without much trouble.

Ranulæ.—I had two cases of sublingual ranulæ, one with suprahyoid extension. They were both cured by means of instillations of a few drops of a twenty per cent. solution of zinc chlorid, repeated several times with a few days' interval between. Wharton's duct was not attacked in either case.

Epulis.—Three cases. Tumors removed with bistoury. The jaw was resected at the place where the sarcoma was attached; the place was cauterized, and the electro-cautery was used as hemostatic agent. Two of these cases have been cured; the third is malignant. The tumor reappeared soon after the first operation, and I operated a second time, cutting away very considerably beyond the limits of the diseased region. The lymphatic ganglia are now attacked, and I am afraid of an extension, notwithstanding that this condition is very rare with epulis sarcomatosa.

Discussion.

Dr. LAURENT. I would like to ask my confrère in what case he would leave the second bicuspid in order to place the crown, and if it would not be sufficient to extract the first rather than the second? The crown is placed between the two, more on the first than on the second. You said that you would leave the second bicuspid.

Dr. VERLUYSEN. No, always the first; very seldom the second.

A MEMBER. Were the epulis growths removed?

Dr. VERLUYSEN. Yes. Cases are on record where the ganglia of the face were affected,—a thing which would probably be looked upon as the sign of general infection.

A MEMBER. Do you know of cases where the growth reappeared after its removal in adults, even with affected glands?

Dr. VERLUYSEN. It is rare. It is necessary to see the nature of the sarcoma.

Dr. BONNARD. Do you make the dental services as a physician or as a dentist?

Dr. VERLUYSEN. As a dentist.

Dr. Bonnard. Then in Belgium there is a dental inspection?

Dr. Verluysen. Yes, in Brussels and Antwerp. In Liége it is being organized.

Dr. Bonnard. It is not a state regulation,—the cities of Brussels and Antwerp have created an inspecting service? Is this inspection made regularly?

Dr. Verluysen. Three times a year.

A Member. Between the visits you have the children sent to you?

Dr. Verluysen. Yes, in serious cases. The parents bring a note from the teacher.

Dr. Bonnard. You give to the teacher a card where the pathological condition of the little children is recorded. That card is given to the parents, who then take the child to the office?

Dr. Verluysen. The mother is always asked to accompany the child.

Dr. Bonnard. We see, then, that Belgium has a well-organized dental service. In France we are trying to establish a similar service, but we find constantly obstacles in our way. The doors of the schools are open to physicians, but closed to dentists.

Dr. Laniol. At Rouen there is a dental service. Every child requiring treatment is provided with a card, with which he can have his teeth treated in any of the public dispensaries.

Dr. Bonnard. It is not an organized service. It is one authorized by the mayor of the city; he can remove the license whenever he pleases. In Paris, for instance, Drs. Godon and Stévenin are authorized to inspect the schools of the eighth district. This was obtained at the cost of great labor and trouble. The necessary operations are performed at the offices of those practitioners.

A Member. The delegate for Brazil tells me that no dental inspection exists in Buenos Aires or Montevideo.

Dr. Bonnard. This question is an exceedingly interesting one. You know the difficulties which we encounter when we have to treat the teeth of children whose mothers know so little about the care that should be given to the teeth. We have to educate them. For this reason we should enter the schools. The physician goes in and lectures on the diseases of children. We have as good rights as the physicians have.

The President. Dr. Bonnard has told us that we have rights. With regard to dental matters we can say that our rights are above those of the physicians, and in order to prove this I will tell you the experience I had a few years ago. A boy twelve years old was brought to my office. He was sent to me by his father, a prominent physician, to have a filling inserted in a second temporary molar which was loose and ready to fall out, in order that the second bicuspid should take its place. I remarked to the mother of the child that it was a temporary tooth, and that it was so loose that a filling was not necessary. She told me that her husband had said that it was a permanent tooth, and, as he knows what he says, I surely was wrong. Three months after I met my confrère Dr. David, who said to me, "Do you know Dr. H——?" I answered that I did. "Well," he said, "he wanted me to fill a loose temporary tooth for his boy."

Dr. CH. CHARPENTIER then read his article entitled

POPULARIZATION OF THE PRINCIPLES OF DENTAL HYGIENE.

It is never easy to introduce a new system, and when it is attempted in the country it becomes more difficult; yet we nevertheless have to work against custom and prejudices which oppose us like impregnable barriers, and which only time and perseverance can destroy. Take, for example, the teaching of agriculture. Twenty years ago the agricultural schools did not exist. How many professors of agriculture, agronomic stations, or instructors could you find devoted to the initiation of the young in farm work? Here or there you could find a professor, but, in spite of all his efforts, it was impossible for him to do all that was expected of him. Gradually, however, agronomic stations were established, and little by little we have come to have farmers possessing a profound knowledge of the soil. It must not be supposed that this was accomplished through official resolutions. It is only through perseverance that we have arrived at the point where we are to-day. It is only by these means—that is, patience, perseverance, and time—that we will be able to popularize the knowledge of dental hygiene.

Let us see what has been done for general hygiene. With the exception of animal hygiene, which has made great progress during these later years, we can say that all the other departments of hygiene are in the embryonic state. Farmers take more care of their animals than they do of their persons. After the works of Pasteur had demonstrated that all epizoötic diseases were contagious, and that the free use of antiseptics was absolutely necessary in order to diminish the rate of death of cattle, a sanitary epizoötic service was created. Several veterinary surgeons were appointed to see that the regulations of hygiene were carried out. The farmer considers his cattle as being his fortune, and in consequence takes great care of them,—at the expense of his body, which he deprives of hygienic care.

In order to pupularize the principles of dental hygiene the essayist proposes the two following considerations: First, conferences, and next the publication of special articles in the general or local newspaper. Several of our confrères, among them Dr. Vidal, have conducted conferences in their districts,—speaking of the diseases of the teeth and mouth, and of those pathological conditions which may be the consequence of an unhealthy condition of the mouth. The writer proposes that in those localities where dentists cannot be found the school-teachers should address their pupils on the subject of buccal hygiene.

After continuing to point out the utility and necessity of dental hygiene, Dr Charpentier finished by hoping that dental services may be established in connection with the country schools.

Discussion.

Dr. CHARPENTIER. It is evident that the professor of agriculture ought to speak about dental hygiene in his conferences.

What I want to see is the creation of a dental inspection in schools.

A MEMBER. The physician should advise the families he visits. The combined advice of the teacher, the professor of agriculture, and the physician would be of great value in the popularization of the principles of dental hygiene.

Dr. RICHER expressed his agreement as to the necessity of creating dental services in the public schools.

Discussion closed.

The president asked Dr. Richer if he could read in anticipation his communication intended for next Saturday's program.

Dr. RICHER said he could not read his paper in full, not having it with him, and therefore he would only speak of the conclusions reached in his paper.

He said that the dental service in the public and high schools, in the colleges, and other educational institutions was very defective. In some cities the service is in charge of dentists, but in perhaps the majority it is in charge of physicians. The results certainly are not all that could be expected. A regulation of the city of Paris places the physicians at the head of the dental service.

The public authorities ought to organize dental services in the public schools; the children's teeth to be examined every three months. A card could be given to the child in which the treatment necessary would be registered. Similar services could be organized in the farming districts.

In concluding, Dr. Richer asked the Congress to adopt his demand in regard to the creation of dental services.

Discussion.

Dr. BONNARD. I propose that we should take the conclusions of Drs. Verluysen, Charpentier, and Richer, and prepare a demand that could be approved by the General Assembly. We will ask all the delegates to see that this resolution is adopted in their respective countries. In fact, if we discuss things without obtaining any practical results our efforts can be considered as being fruitless ones. I propose that the following request should be made:

"The members of Section VIII, after hearing the report of Drs. Verluysen, Charpentier, and Richer, urge that conferences on dental hygiene should be given in the schools and country communities, and that a dental service in charge of dental surgeons should be organized by the Administration de l'Assistance Publique, the object being to popularize the principles of dental hygiene."

The PRESIDENT. Ten or fifteen years ago M. Hayem, mayor of the eighth district, asked me to organize a dental service. I used to operate on Sundays, and in this way I assure you that I did a great deal of good to the families living in the country.

Dr. BONNARD. As long as the dentist is isolated he is likely to lose patience. We must confess that very often apathy replaces energy. There are many men capable of rendering valuable services, but they do not do it because they are alone, and are not stimulated by that spirit which is born of association. This apathetic condition will not survive the time when an inspecting service shall be organized.

The question of expenses and fees should not be an obstacle toward the realization of the questions under consideration, for I believe that the reputation which the practitioner will acquire by doing this sort of work will be enough to compensate for his trouble. If the position should be a remunerative one a spirit of competition would surely predominate.

It is not only necessary that the candidate should be familiar with the principles of hygiene, but he must also be able to inculcate them, and this is sometimes the most difficult part of the problem.

Discussing the advantages which may accrue to the practitioner as a consequence of his operations on school-children, Dr. Bonnard concluded by saying that the principal thing to be done just now is to invest with an official character our intervention in the schools.

A MEMBER. The conferences could be made by the inspecting official.

DR. BONNARD. Also by the teachers. We must not forget the antagonistic feelings of the government, and the only way to obtain something is by making demands. A congress is an imposing force, and they will be forced to pay attention to our demands. The official delegates of foreign governments will report to their governments all the demands that will be made at the General Assembly of the Congress.

In the next meetings of our Section this question will be presented under a different phase. We will have an interesting communication by Dr. Mora.

The Section then adjourned.

(To be continued.)

NEW JERSEY STATE DENTAL SOCIETY.

AT the annual meeting of the New Jersey State Dental Society the following officers were elected for the ensuing year: F. Edsall Riley, Newark, president; Wm. L. Fish, Newark, vice-president; Charles A. Meeker, Newark, secretary; H. S. Sutphen, Newark, assistant secretary; Henry A. Hull, New Brunswick, treasurer. Executive Committee, H. S. Sutphen, Oscar Adelberg, F. L. Hindle, W. H. Pruden. Membership Committee, G. M. Holden, J. L. Crater, W. W. Hawke, A. Irwin, W. W. Woolsey.

CHARLES A. MEEKER, *Sec'y.*,
29 Fulton st., Newark, N. J.

NORTHERN IOWA DENTAL SOCIETY.

AT a meeting of the Northern Iowa Dental Society, held at McGregor, Iowa, September 4-6, 1900, the following officers were elected for 1900-01: W. R. Clack, Clear Lake, president; J. A.

Walter, McGregor, vice-president; Wm. Finn, Cedar Rapids, secretary; H. W. Rizer, Lansing, treasurer. Next meeting to be held at Lake Okoboji, the first week in September, 1901.

WM. FINN, *Secretary.*

NORTHERN ILLINOIS DENTAL SOCIETY.

AT the thirteenth annual meeting of the Northern Illinois Dental Society, held at Aurora, October 24 and 25, the following officers were elected for the ensuing year: Dr. W. C. Bunker, Oregon, president; Dr. C. R. Currier, Aurora, vice-president; Dr. J. J. Reed, Rockford, secretary; Dr. M. R. Harned, Rockford, treasurer. Member of Executive Committee, Dr. A. W. McCandless, Chicago. Next meeting to be held at Joliet.

J. J. REED, *Secretary.*

DENTAL SOCIETY ANNOUNCEMENTS.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

NOTICE! NEW COLLEGES.

To whom it may interest: At the annual meeting of the National Association of Dental Faculties, held at Niagara Falls, 1899, the following action was had:

"*Resolved,* That a commission, consisting of three persons, be appointed, whose duty it shall be to take cognizance of, investigate, and advise with any parties contemplating the establishment of a new college or the reorganization of an old one.

"In the performance of the duties of this commission it shall be competent to take into consideration the following points, viz: All the circumstances that attach to it; the motive that prompts such an organization; the need for it; the resources that may be available for its establishment, and any other points that have a bearing for or against the establishment of a proposed college. The attainment of full knowledge on these points would enable the commission to advise wisely. Any party or parties having in contemplation the organization of a new dental college, or the reorganization of one already in existence, are requested to communicate with this commission for conference.

"It shall be the duty of this commission to report to this body at each annual meeting, giving in detail such facts and conditions pertaining to the subject as the commission may find."

J. TAFT, *Chairman,* Cincinnati, Ohio,
GEO. E. HUNT, Indianapolis, Ind.,
FRANK HOLLAND, Atlanta, Ga.,
Commission.

INSTITUTE OF DENTAL PEDAGOGICS.

THE seventh meeting of the Institute of Dental Pedagogics will be held in Nashville, at the Maxwell House, beginning at 10 o'clock Thursday, December 27, 1900, and will continue three days.

The program will be forwarded to all the journals in time for publication in the December issues. Every one interested in dental teaching should feel it his duty to attend, as it is his privilege to speak on any subject on the program. The interest of last year will be maintained, and the plan of developing thoroughly a few topics given a trial.

A most cordial invitation is extended to all, especially to those who are teachers.

HENRY W. MORGAN,
D. M. CATTELL,
W. E. WILLMOTT,
Executive Committee.

MARYLAND BOARD OF DENTAL EXAMINERS.

A MEETING of the Maryland Board of Dental Examiners will be held at the dental department of the University of Maryland, Baltimore, Thursday and Friday, November 15 and 16, 1900, for the examination of candidates to practice dentistry.

The written examinations will be in operative and mechanical dentistry, anatomy and physiology, pathology, therapeutics and materia medica, chemistry, and oral surgery; and candidates will be required to insert a gold filling in the mouth, and also exhibit specimens of prosthetic work, properly vouched for.

Application blanks properly filled, accompanied by the fee of ten dollars, must be filed with the secretary prior to day of examination.

F. F. DREW, D.D.S., *Secretary,*
701 N. Howard st., Baltimore, Md.

BOARD OF DENTAL EXAMINERS OF PENNSYLVANIA.

THE Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia and Pittsburg, December 17, 18, 19, and 20, 1900.

Application for examination must be made to the Hon. James W. Latta, secretary of the Dental Council, Harrisburg, Pa.

G. W. KLUMP, *Secretary,*
Williamsport, Pa.

NEW HAMPSHIRE DENTAL SOCIETY.

CHANGE OF DATE OF MEETING.

THE date announced for the meeting of the New Hampshire Dental Society being election day, it has been thought advisable to postpone the meeting till November 13 and 14. FRED. F. FISHER, *Secretary.*

EDITORIAL.

GALVESTON.

THE terrible cyclone which devastated the city of Galveston and the loss of life and property resulting therefrom are matters which in a general way are known throughout the whole world. Efforts for the relief of the distressed survivors are being made in all directions, and considerable sums of money are being sent to the general relief committee, and are being wisely expended.

There is, however, an aspect of this calamity which appeals with especial emphasis to the dental profession,—namely, the suffering which many of our colleagues in the stricken city are enduring, and from which they have no prospect of immediate relief.

The editor of *Dental Clippings,* a journal published in Houston, Texas, has made a personal investigation of the condition of the surviving dentists in Galveston, and reports a heartrending condition of affairs which should appeal to dentists throughout the land as an object having the strongest claims upon their charitable consideration.

We republish herewith the report made by Dr. Edge, together with a number of letters from members of our profession in Galveston, which will give a graphic picture of the condition. We do this in order that the appeal for help may reach all of our readers, and we add our earnest solicitations to those of the editor of *Dental Clippings* that contributions be promptly forwarded to Wm. H. Stuart, Houston, Texas, with the assurance that all moneys so sent will be conscientiously applied to the alleviation of the suffering members of our profession. No more worthy cause has ever been presented to us; no appeal to which the sentiments of professional brotherhood should more promptly respond.

We trust that those active in the work of dental organizations will present this matter strongly to their respective associations and secure liberal contributions from these bodies, and from individual practitioners so far as it may be possible to do so.

AN EARNEST APPEAL.

The editor of this journal has just returned from the stricken city of Galveston.

After having looked upon the many heaping masses of ruins, the hundreds of people with clothing all tattered and torn, eyes knocked out, ears torn off, legs and arms broken, and listened with tear-bedimmed eyes to the stories of some who lost their loved ones, he feels it a duty to call upon the dental colleges, dental manufacturers and dealers, and the dental profession throughout this country FOR AID. There was never a time when some of our people needed financial assistance as they do in that city now. The dentists there have not suffered a great deal, only there will be no work, except urgent cases, for some time to come. The outstanding accounts will nearly all be lost. It is not these for whom we are especially asking aid—it is the poor people who are sick and in distress. All contributions, however small, will be gratefully received by William H. Stuart, Houston, Texas, and turned over to the proper authorities, unless otherwise ordered, and duly credited with name and amount in the next issue of *Dental Clippings*. We hope all journals will copy this appeal, and credit will also be given them.

Dr. Arnold, Galveston, had no lives lost in his immediate family, but his home and furnishings were damaged to the amount of two thousand dollars.

Dr. Bell, Galveston, had considerable loss to his instruments and office furniture by the water flooding his office.

Dr. Carruthers, Galveston, considers himself very fortunate in that he escaped with all his family, no damage to his office, and only about five hundred dollars to his home and furnishings.

Dr. C. M. Doss, Angleton, is reported as having lost everything. Building in which his office was located completely wrecked. We have no estimate as to how much his property was worth.

Dr. A. A. Dyer, Galveston, had considerable loss at home; no lives lost, and no damage to office.

Dr. D. S. Killough, Galveston, had no loss at his office, his family all saved, though his household effects were considerably damaged.

Warren Bros., of Galveston, escaped without a scratch.

Dr. A. Sundt, Galveston, suffered some damage to his office, and had his home and its entire contents washed away. His family, being in Europe, escaped, but a family of five who were occupying the house during the absence of his family were all drowned. Dr. Sundt's home and effects were valued at from seven to ten thousand dollars.

Dr. Kopperl, Galveston, and wife were visiting in Carrollton, Ill.; had no damage to office.

Dr. J. W. Simpson, Galveston, home and contents destroyed; no lives lost and no damage to property. Dr. Simpson is visiting in New York.

Dr. F. D. Wolf, Alvin, lost all household furniture and a number of instruments considerably damaged.

Dr. McGowan, Galveston, no lives lost, no damage to office. Had some damage to property in Houston.

Dr. P. H. Rogers, Alvin, father's house badly damaged and barns destroyed.

Dr. M. O. Perkins, Galveston, lost a sister-in-law; office damaged by water.

Dr. B. T. Thielen, Angleton, instruments buried under four feet of brick and rubbish. He has left for Nashville, Tenn., where he accepted a position in the Vanderbilt University.

Dr. M. J. Lossing, Houston, had the misfortune of losing his sister and mother in Galveston.

Dr. D. K. Murchison, Angleton, had a small loss; bruised his leg, which he is suffering from at present.

Drs. Koehler, Holmes, and Nichols all escaped without any loss in their offices.

Dr. B. T. Perkins, Houston, was damaged about one hundred dollars' worth in his office.

GALVESTON, TEXAS.

EDITOR *Dental Clippings*,—Yours of recent date to hand this morning. I feel grateful for the interest you have taken in me. Thanks to an Allwise God we had but one member of our family lost; the body has not been seen or heard of. Galveston has lost thousands of her people; not one in the city has escaped injuries or losses to some extent. Merchants have had at least two-thirds of their stocks washed away or damaged. The awful sights cannot be told in words, much less written. There is no human tongue that can express these experiences. About the only expression you can hear is, "Thank God, I see you are saved." No questions asked about each other's family. My financial loss was between three hundred and four hundred dollars. Galveston is a horrible sight at present. More than two hundred blocks of residences have been swept into the sea, and not as much as a piece of timber left to mark the spot. There is absolutely no business here now.

Yours respectfully, DR. BOCK.

GALVESTON, TEXAS.

EDITOR *Dental Clippings*,—Your kind inquiry concerning my family and my own welfare received, and I assure you is highly appreciated.

THANK GOD, I am happy to be able to say that all my immediate family are safe. My wife left Friday to be gone until conditions here are improved. Damage at my office was slight; at home about two hundred dollars; but my greatest loss is in outstanding accounts and the terrific hole knocked in my practice by death and destruction of property, which will make people unable to pay for dental services except the most urgent. My ledger, I am confident, will show a loss of no less than one thousand dollars, for the L. and L. collections had been partly neglected. Yours truly,

H. W. LUBBEN, D.D.S.

GALVESTON, TEXAS.

EDITOR *Dental Clippings*,—We received your letter of inquiry, for which we thank you. Dr. Sundt was the heaviest sufferer; lost his home completely. He feels very much crushed. I therefore write for him. I, too, lost in my home. None of my family were lost. It will cost considerable to repair. Yours truly, D. L. KILLOUGH.

GALVESTON, TEXAS.

EDITOR *Dental Clippings*,—Your letter of sympathy just to hand. Accept thanks of myself and family for same. I just did save my family by the merest chance. I lived at the extreme west end of the city. All the houses west and south of the block I am living in are swept away. I lost all my clothing and dental tools. I found part of my vulcanizer four blocks from my house. My furniture—what is left of it—is falling to pieces. With all my misfortune I am happy to know I have saved my family. With regards, I remain yours truly, J. N. WILSON.

GALVESTON, TEXAS.

EDITOR *Dental Clippings*,—Many thanks for your kindness and sympathy. Family all safe with but few cuts and bruises, but lost nearly everything we had. Again thanking you, I am sincerely, DR. C. D. HOLMES, JR.

GALVESTON, TEXAS.

EDITOR *Dental Clippings*,—Yours of the 14th inst. to hand. Accept my heartiest thanks for your kind wishes. Yes, Galveston has suffered greatly from the storm of the 8th inst. You ask how my people and I fared. Well, I can thankfully say the dear Lord has spared our lives, but my mother has been seriously, though not fatally, hurt. I was considerably bruised up, especially so on my left arm, and my younger brother had his right hand cut up considerably. Our home and its contents are a total loss, having fallen over and smashed into splinters, and my practice has been ruined. So my dear people and myself are in bad circumstances, having lost everything we possessed. However, we can be thankful the dear Lord has saved us from so terrible a death. With kindest regards, I am your truly,

R. EMIL KOEHLER.

Galveston, Texas.

Editor *Dental Clippings,*—Your note of sympathy has just reached me, due to my not coming to the office any sooner. My loss in the office is not so much, being due mostly to rust on my tools and burs especially. What we dentists in this town are going to do for the next six months God only knows. All our accounts are dead, and what little we make will be credit. We are all cheerful, however, and hope soon to get a new start in the race of life.

At present we can't work, having no means to solder. The gas works is a member of the dead list.

Hoping soon to be able to write more cheerfully, I remain

Dr. W. S. Carruthers.

P. S.—Father lost everything he had but the roof over his head.

Galveston, Texas.

Editor *Dental Clippings,*—Yours of the 14th was received yesterday. My wife and I want to express our gratitude for your heartfelt expression of sympathy.

You ask what damage I or we sustained.

First—Miss Pauline Marcotte, my wife's only sister, was lost before our very eyes while I was struggling to save them. I saved my wife—by a miracle we were both saved. Floated on drift till midnight. Will tell you when I see you.

Recovered Pauline's body and buried her decently, considering the circumstances.

As to our financial loss, it is total as far as home is concerned. House and contents, buggy, cow, and all gone to Texas City or somewhere. Office and furniture and instruments damaged; new fifty-dollar carpet ruined; roof blew off and windows blew out and let in water.

My loss is in all about three thousand dollars if invoiced. I had an invoice of both office and house, but all papers are lost, and the invoice went about thirty-one hundred dollars, including office and all personal property.

Not a trunk, box, valise, or anything was saved. We took our little tin box of valuable papers, including notes, a will, etc., with us, but lost it overboard together with a valise full of clothing. So I was left without even a hat. May God spare me another time like that. No one in the flood of Noah's time had a more dreadful time.

I intend remaining here; don't see anything else to do; and hope all will come out straight.

Yours truly,

M. O. Perkins.

Columbus, Texas.

Editor *Dental Clippings,*—Your inquiry received and I am glad to say that I received no damage from the storm except destruction of valuable shade trees and slight damage to my house.

Yours truly,

W. T. Yarbrough.

Giddings, Texas.

Editor *Dental Clippings,*—In reply to your inquiry as to storm damage, I have to say that, thanks to a merciful Providence, we sustained no loss personally from the hurricane of the 8th inst. Though the wind was fearful, and we were much frightened, we escaped without injury or damage.

Sincerely yours,

M. S. Merchant.

Richmond, Texas.

Editor *Dental Clippings,*—This country was almost ruined, owing to rains before the storm, and the storm finished things. The damage to this town alone is estimated at about $200,000. The building which my office was in lost its roof and a part of one wall, flooding my office. I found it about two inches in water the next morning, damaging me to some extent, but I can make out with it *these times.* What I need worse is work. Do you know of any dentist who needs an operator? I would like to work for some one until these people get straightened out, and able to have dental work done. Any assistance you could be to me along that line would be greatly appreciated by me.

Very truly yours,

S. B. Cobb.

LaGrange, Texas.

Editor *Dental Clippings,*—Replying to your favor of 17th inst., will say that LaGrange, by some kind act of Providence, escaped from the storm, very little damage being done.

The building in which my office is located was not injured in any way. With best wishes, I am yours truly, R. P. Thomas.

Brenham, Texas.

Editor *Dental Clippings,*—No damage by storm except a few window panes broken, awnings and sign blown down. My cousin has no office. I am real fortunate compared to some of my brother dentists.

Yours truly, G. W. Wilbusch.

Navasota, Texas.

Editor *Dental Clippings,*—Your letter received asking me to state what loss I sustained by the recent storm. I am glad to say that I had no personal loss. The damage here was not very great, and what there was was distributed among different parties who will not feel it very much. The principal loss to our county was the damage done to the crops.

Respectfully yours, (Dr.) W. Ward.

Rosenberg, Texas.

Editor *Dental Clippings,*—Yours of recent date received and contents noted. I am glad to say that I was not damaged any at all by the storm, though our country is a total wreck, and all that are able to get away are going to leave this country. Yours truly,

W. S. Gardcke.

Hempstead, Texas.

Editor *Dental Clippings,*—Yours of the 17th inst. to hand and contents noted. In reply will say that I have consulted with those who have been engaged investigating the losses of our town and county. Hempstead's loss is two hundred thousand dollars. The county loss is eight hundred thousand dollars. Total for town and county, one million dollars. If there is anything more that I can serve you, write. Yours respectfully,

G. W. Ellington.

P. S.—My office was blown all to pieces. I lost two hundred dollars or more.

LET THE COBBLER STICK TO HIS LAST.

With commendable energy and enterprise the editor of the *Cosmopolitan* has undertaken to disseminate useful knowledge by publishing a series of essays upon hygiene. These essays have dealt with the hygiene of various important organs and functions of the body, and have been selected upon a competitive basis, the competition being stimulated by the offer of a monetary reward to the author whose essay was selected for publication. It is of course understood that this effort at enlightenment was not a wholly disinterested one *pro bono publico,* but is in some measure a well-conceived advertising scheme, from which both the magazine and the public are expected to derive benefit. Several of these prize essays have appeared, but the one which immediately concerns us is that printed in the October issue upon "The Care of the Teeth," written by Arthur DeVoe. We do not know Arthur DeVoe. We never heard of him, nor do we know anything about his relations to the body politic or his business in life. The editor, in introducing him to the *Cosmopolitan* audience, refers to him as Dr. DeVoe. What kind of a doctor is not specified. We surmise from a perusal of his effusion that he is of the M.D. variety.

We deem it of importance to examine this prize essay on the teeth, for the reason that it will reach the very large circle of readers of the *Cosmopolitan* subscription list, and, because written by a doctor, it will be taken as authority, especially when the editor takes pains to state concerning the essay that it "will give within the limits of a magazine article all that one should know of a subject whose literature is not readily accessible to the general public." The article displays two serious defects: first, the ignorance which the author manifests concerning his topic; second, a spirit of antagonism toward the dental profession, both of which combine to make it a dangerous guide and a libelous perversion of the truth.

It is possible that the author has suffered physically at the hands of some dental operator, or has been unduly impressed by the material success of a dental practitioner in his own neighborhood. Whatever may be the cause, he seems to be laboring under a condition of mental astigmatism with respect to the dental profession, for he says, "Our dentists are a busy and thriving class, and if we have a patriotic pride in their achievements the feeling has a rueful basis, for the profession is waxing rich upon movable molars and crumbling cuspids." We have been charged with all sorts of things, but never before with waxing rich. Let those who are guilty on this count speak out and relieve us of this general heinous charge.

Our learned author says, "Teeth in man are classed anatomically and physiologically as organs of digestion." Just why they are so classed he does not say, nor does he explain in what manner digestion of the food is carried on by the teeth. We had always supposed that digestion was a chemico-vital process brought about mainly by the digestive ferments secreted by certain glandular structures of the alimentary tract, and that the function of the teeth was the mechanical one of mastication. Again he says, "If modern man is becoming independent of nature in regard to his teeth, the gain, so far as it is a gain, is not wholly due to the dental art."

What evidence is there to show that modern man, or any other man, is becoming independent of nature? If this were not a quotation from a prize essay we might mistake it for bosh. To throw a side light on his meaning the author relates that man may exist for long periods without taking food through his mouth, and yet be well nourished in all his tissues.

"Highly wrought manufacturing, chemical, and culinary arts present our nourishment moist, warm, and partially digested, and ready for swallowing or absorption without the aid of teeth." But, notwithstanding this triumph of art over nature, which the author seems to regard as rendering our dental apparatus practically superfluous, he seems on second thought to realize that they may, after all, have some possible usefulness, for he says, "May we not put away many of our evil habits of self-indulgence and luxury and as one incidental benefit find our children in possession of stronger and better teeth?"

He wisely selects scurvy as a typical dental disorder, illustrating the evil effects of improper feeding on bodily nutrition, resulting, among other things, in spongy and bleeding gums and loosening teeth, and instances the occurrence of this disorder among Klondike exiles; which is all very well as far as it goes, but as Klondike exiles form an insignificant proportion of people needing dental care and attention, and are probably beyond the reach of Dr. DeVoe's published wisdom, his illustration would have been more forcible and of greater benefit to a greater number if he had called attention to the more prevalent scurvy of infants due to their improper feeding with the numerous proprietary infant foods with which the whole civilized world is at present flooded.

He lays great stress upon the importance of proper nutrition in the building and development of sound teeth of healthy structure, upon which no criticism can be made; but his opinion of modern dental achievement in its prophylactic, restorative, and remedial aspects is summed up in the following paragraph:

"Let us not undervalue the local technic,—the superficial arts of the toilet or of the dentist. Doubtless many of these are extremely useful as well as ornamental, capable of minimizing the processes of waste and decay and preserving a measure of the beautiful where otherwise would be offensive deformity,—sources of mischief, to be reflected on the whole economy of life."

We assume that the author of this essay is a physician and not a dentist, because of his antiquated dental terminology. He refers to the cementum as "cortical substance," and to the root of the tooth as its "fang." He labors along through the period from conception to the eruption of the deciduous teeth with many wise reflections upon hygiene, nutrition, and development, and then goes back, probably having overlooked the matter, to the condition of the infant oral cavity previous to the appearance of the teeth, wisely calling attention to the importance of proper digestion as a prerequisite to normal development of all of the bodily tissues, and states very properly that "persistent indigestion, delicacy, or weakness of the child will suggest that the food-supply is insufficient, unassimilated, or adulterated." We may add that the same conditions would suggest to a properly educated dentist that the child probably had a dirty mouth containing fermenting food débris, which was a source of infection to the whole gastro-intestinal tract. But we have not met one physician in a hundred who thought it worth while to cleanse an infant's mouth with anything like the same care with which they usually require the feeding apparatus of the infant to be cleansed and sterilized.

Having exhausted his store of wisdom with reference to prophylaxis and nutrition, and probably finding from experience that even the best he can do fails occasionally to avert the invasion of caries, he at last mildly falls back upon the dentist, and says, "If, in spite of care and cleanliness, the milk-teeth should be attacked by caries, it may be wise to have the dentist assist in checking its ravages."

But when he comes to the discussion of caries he exhibits the acme of his dental ignorance. He says, "Caries, the most common form of decay of the teeth, always begins in the enamel, generally at some point on the crown, in the form of a minute opaque or brownish speck, which gradually extends toward the center of the organ, assuming as it progresses a blackish color, and becoming soft and brittle," a statement which both in matter and in grammar is fearfully and wonderfully made. But hear him further: "Causes of caries exist in various defects of the vital and functional processes of the body. There is probably a microbic element, infectious in character. No doubt a morbid local element may exist in evil acid juices secreted by dyspeptic stomachs. Among other local and direct causes are accumulations of tartar upon the teeth, want of cleanliness in the mouth, and steady, persistent pressure of the teeth against each other. . . . Every part of the crown appears to be equally liable to caries. . . . Caries causes pain in the teeth and inflammation of the gums, jaws, and other parts. . . . Gum-boils are a frequent consequence of caries. . . . The question of the conservation of carious teeth by timely dental cleaning, and filling with gold or other non-corroding substance, is one which should be considered with the assistance of trusted professional advice." (Consult Dr. DeVoe?)

He recommends as an efficient antiseptic for the mouth ten drops of commercial formalin in half a pint of pure water, which, if desired, may be combined with chalk and orris. No directions are given as to the relative quantities of the latter to be added to the formalin solution, and whether it is to be made into a paste or a gruel is left to the judgment of the now instructed reader. After telling at considerable length how much the physician knows about the teeth, and how his advice should be sought on all questions of hygiene which may directly or indirectly affect the teeth, he pays his attention to the dentist by saying, "We must not forget the dentist. He is to be reckoned with. His ministrations are not always agreeable even when most useful, and, truth to tell, not always timely and skillfully done when most painful. . . . It is a pity that we should have cause to believe that he may sometimes introduce new vice and poison from without. We should be reassured to find him scrupulously and even ostentatiously clean personally and in the care of all his implements. . . . As these matters go at present, they form additional ground for urging that parental watchfulness and individual care shall lessen the demand for the dentist's work, and less frequently expose the patrons to his chronic carelessness after handling septic mouths with septic instruments."

We think the foregoing quotations are sufficient to support the characterizations which in the beginning we applied to this prize essay. It is doubtless true that there are dentists who are incompetent, and who are filthy in their habits, and who are careless with respect to septic conditions in their work. Modern dentists, dentistry, or dental practice are not represented by these any more than modern antiseptic surgery is represented by the surgeon who operates for a strangulated hernia with a knife which he has sharpened on the sole of his shoe, and who soaks up the blood from the operation with a filthy sponge which he has carried around in his coat-tail pocket, or, again, by the surgeon who operated in the case of procidentia uteri by ligating the extruding organ with a shoemaker's waxed-end, in the belief that he was dealing with a benign hypertrophy which could be ligated and allowed to slough off after the manner of a wart so treated.

These are not fanciful cases, but have actually occurred within the knowledge of the writer; yet no one would for a moment claim that these represented enlightened surgery and practice.

Dr. DeVoe has advertised his ignorance of modern dental teaching and practice. He has either drawn on his imagination for his dental information or gathered it from medical publications,—the majority of even the most recent of which are in this department half a century behind the times.

But this is of secondary importance to the regrettable fact that a journal exerting so large an influence for good should have published an article upon so important a matter which, because of its scientific inaccuracy and misleading advice, fails of the object for which it was published,—viz, as a trustworthy guide to the uninformed.

THE DELAYED ISSUE.

We ask the indulgence of our readers for the delay incident to this issue.

The official report of proceedings of the International Congress was delayed in transshipment to this office. The large amount of work incident to the translation and preparation of the matter for our pages, together with the illness and death of our efficient proof-reader, Mr. E. H. Lawrence, will explain in some degree the late appearance of the journal this month. We trust, however, that compensation will be found in the amount and character of matter presented, which, besides the usual quota, amounts to sixty-four additional pages,—nearly double the reading matter of our regular issue.

BIBLIOGRAPHICAL.

The American Text-Book of Prosthetic Dentistry. In Contributions by Eminent Authorities. Edited by Charles J. Essig, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy, Department of Dentistry, University of Pennsylvania, Philadelphia. Second Edition, Revised and Enlarged. In one octavo volume, pp. 817, with 1089 engravings. Cloth, $6.00; leather, $7.00. Lea Brothers & Co., Philadelphia and New York, 1900.

The general adoption of the "American Text-Book of Prosthetic Dentistry" as a standard work in the teaching of this subject and the rapid exhaustion of the first edition are evidences of its value and popularity.

The possibility of preparing an acceptable text-book by the method of composite authorship has by the same facts been shown to be a practical success. It is possible that in the future the major departments of dental study and instruction—namely, prosthetic and operative dentistry—may need for their systematic exposition text-books dealing with subdivisions of the general subject, an event not at all unlikely when one considers the marked tendency to specialization both in teaching and in the practice of the several departments which go to make up the whole of dentistry.

The increasing amount of material which it seems needful to compress within the pages of a text-book furnishes a problem to the editor or writer presenting serious difficulties. He is confronted on the one hand with the danger of omitting that which may be valuable, and on the other hand with the disadvantage which the inclusion of a large bulk of material involves both for teacher and student.

The selection and logical arrangement of the large mass of matter which falls legitimately within the province of prosthetic dentistry requires, in the first place, a keen perception of what is really valuable, and, in the second place, an understanding of the needs of teacher and student in order to produce a work which shall neither be redundant in matter nor deficient as a text-book.

To say that both of these objects have been fairly attained in the work under consideration is to simply record a self-evident fact. The long experience of the editor, both as practitioner and teacher, eminently qualifies him for the work, and the result is the outgrowth of his experience in both these departments. His collaborators, to whom have been assigned the preparation of chapters dealing with sub-departments of the general subject, are eminent specialists, qualified by study and experience to speak with authority each in his particular field. Collectively, the work may be taken as representing the best modern thought upon the subject with which it deals. The second edition has been thoroughly revised; errors and obsolete features have been eliminated, and considerable new matter has been added, particularly in the matter of illustration. The work has been enriched by the addition of a large number of new illustrations, many of them original and specially executed for the work. No new chapters have been added, although the addition to Chapter III of an exposition of Orthodontia Technic, by Dr. Goddard, is a new and important addition which constitutes practically a new chapter on that subject, which is properly included in the general chapter by the same author on the "Principles of Metal Work."

Chapter XV, which in the first edition appeared as the work of the editor, now, with some minor alterations, appears as the work of Dr. Norman S. Essig, though the text, with the exception of about two pages and a half of additions, is identical with the preceding edition. Evidently an error with respect to the authorship of this chapter has occurred.

The editor pays a graceful and well-deserved tribute to the memory of his "friend and co-worker Dr. Henry H. Burchard," but we think that the editor is in error when he suggests that "the chapters assigned him in the preparation of the first edition called forth his first important literary efforts, and the work within its pages which bears his name was sufficient to reveal to him the power he possessed." Dr. Burchard was an extensive writer before he contributed to either the "American Text-Book of Prosthetic Dentistry" or the "American Text-Book of Operative Dentistry." His literary ability was a natural gift, of which he was fully cognizant, and, while it is true that his larger work as a writer upon the technical matters of dentistry began with his contribution to the books in question, he was a writer and teacher of known ability and seasoned experience previous to that period.

The improvements and amplification presented by the second edition of the "American Text-Book of Prosthetic Dentistry" cannot fail to maintain it in the position which it easily achieved for itself upon its first appearance as the leading text-book on the subject with which it deals.

DENTAL METALLURGY: A MANUAL FOR THE USE OF DENTAL STUDENTS AND PRACTITIONERS. By CHARLES J. ESSIG, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy, Dental Dept. Univ. of Pa. Fourth edition, thoroughly revised by AUGUSTUS KOENIG, B.S., M.D., Demonstrator of Metallurgy, Dental Dept. Univ. of Pa. and Assistant Demonstrator of Histology, Medical and Dental Depts. Univ. of Pa. 12mo., 277 pages, with forty-three engravings. Cloth, $1.75. Lea Bros. & Co., Philadelphia and New York, 1900.

This work, already well and favorably known to dental teachers and students, has in the fourth edition been much improved, and brought thoroughly up to date in all important particulars.

An important and noteworthy addition, which adds greatly to the practical teaching value of the book, is the series of experiments designed for the laboratory instruction of students. These experiments have been prepared by Dr. Koenig with reference to their value in elucidating the text and practically impressing the teachings of the work upon the mind of the student.

Metallurgy is so essentially a subject of laboratory instruction that all who have had any experience as teachers in this department will find these suggestive experiments a helpful feature in their course of instruction. The more recent developments of laboratory apparatus and methods have been included, and all data have been revised in the light of recent research; so that this practical little work is now thoroughly abreast of the most modern requirements in the field of which it treats.

STUDENTS' MEDICAL DICTIONARY. By GEORGE M. GOULD, M.D. Eleventh edition. Price $2.50. Philadelphia, P. Blakiston's Son & Co., 1900.

Language is a vital thing, developing and enlarging with the progress and experience of humanity. A dictionary which reflects this vital quality must be constantly renewed, revised, and enlarged if it is to truly set forth the existing status of the language.

We have favorably commented upon the standard dictionaries edited by Dr. Gould, and we regard them as more truly fulfilling the ideal and practical requirements of a dictionary than any other within our knowledge.

The present edition of the "Students' Medical Dictionary" has been amplified by the addition of fully one hundred pages of new matter, new tables, and illustrations.

We again commend this invaluable work to all dental practitioners and students who need a good dictionary; and who does not?

DISCOVERY OF ANESTHESIA BY HORACE WELLS.—MEMORIAL SERVICES AT THE FIFTIETH ANNIVERSARY. Handsomely bound in cloth, pp. 124, price $1.00. Philadelphia, The Patterson & White Company, 1900.

This work is a republication of the proceedings of the fiftieth anniversary meeting of the discovery of anesthesia by Horace Wells, together with a history of the movement which led to the holding of the meeting, the addresses which were given, a full report of the speeches at the banquet, and much of the important evidence which was brought forward tending to establish the priority of Horace Wells's discovery of this boon to humanity.

Those who were present at the meeting will long remember it as one of the great occasions in the history of our profession. Every one who has an interest in the achievements of dentistry should be familiar with the events surrounding a discovery which has not only been one of the crowning triumphs of our profession, but the noblest humanitarian discovery the world has ever known. This republication places within the reach of all a full exposition of the salient facts, and should be upon the library shelves of every progressive dentist.

FACTS, FADS, AND FANCIES ABOUT TEETH. Compiled and Edited by HENRY LOVEJOY AMBLER, M.S., D.D.S., M.D., Dean of the Dental Department and Professor of Operative Dentistry and Dental Hygiene, Western Reserve University. Pp. 310, with many illustrations. Cloth, $2.00. The Helman-Taylor Co., Cleveland, Ohio, 1900.

This work is a heterogeneous collection of alleged humorous material about the teeth, which has been gathered from a variety of sources. Its editor trusts that the result of his labors "may serve to entertain some weary brother during a leisure moment."

Humor is a delicate thing, and is so nicely balanced that unless of the highest order it may not only fail of its purpose to amuse, but have the directly opposite effect; hence we fear the result of publishing a collection of this character,—a kind of omnium gatherum of all sorts, good, bad, and indifferent,—in a single volume. The chances are that instead of "entertaining some weary brother," it may make the brother weary before he has gotten through even a small portion of it.

It would have been well to have omitted the large sprinkling of bad jokes gathered from the columns of daily newspapers, which, if they ever do produce amusement, it must be in a type of mind incapable of appreciating any form of humor which does not depend for its effect upon its vulgarity. There are some good things in the book which are swamped in a mass of unreadable stuff which should have been strangled at its birth.

We cannot avoid quoting, with reference to this publication, a remark accredited to Abraham Lincoln when asked his opinion concerning the poetical effusion of a certain crank,—namely, "If anybody likes that sort of thing, why that's just about the sort of thing they would like."

OBITUARY.

DR. J. W. WORTMAN.

Died, May 11, 1900, at his home in Muskingum county, Ohio, J. W. Wortman, D.D.S., from apoplexy, in his seventieth year.

Dr. Wortman was born in Muskingum county, Ohio, January 11, 1831. He studied dentistry in the 50's with Drs. Watt and Taft, at Xenia, Ohio. He first practiced at Dresden, Muskingum county. He afterward took a portion of the course of study at the Ohio College of Dental Surgery, Cincinnati, and after an interval of a few years returned to that institution, completed the course, and received his degree.

Dr. Wortman had practiced his profession in Dresden, Columbus, and Zanesville, Ohio. Subsequently he had practiced in Madison township, of which he was one of the most highly respected residents. He was never robust in health, and suffered from kidney-trouble for a long time before his death, which occurred upon the anniversary of his marriage. His widow was formerly Miss Mary E. Kinnney, to whom he was married May 11, 1856, at Dresden, Ohio.

DR. CHAS. WELCH.

Died, September 9, 1900, at Wilmington, Ohio, from heart-failure, Charles Welch, D.D.S., in his fiftieth year.

The deceased was the son of Dr. L. B. Welch, and was born in Wilmington, Ohio, July 4, 1850. Having received his earlier education in the public schools and afterward attended Franklin College, Wilmington, Charles Welch entered the Ohio College of Dental Surgery. On being graduated, in 1871, he became his father's partner. He was thenceforward engaged in professional work in the same office continuously for twenty-nine years, or until shortly before his death. He ranked high professionally, being well known throughout the state for his ability and progressiveness. He was elected president of the Ohio State Dental Society for 1894. At the time of his death he was a member of the Board of Managers of the Ohio College of Dental Surgery, a position he had filled for many years.

On October 5, 1876, he married Olive Linton, daughter of Cyrus Linton. She survives him.

RESOLUTIONS ON THE DEATH OF DRS. MENGES AND CUSHING.

THE following resolutions were passed by the Manila Dental Society, August 6, 1900:

The Manila Dental Society, numbering among its members former associates and pupils of Dr. Theo. Menges, has learned with great sorrow of his demise while yet in the prime of manhood, and has adopted the following resolution, of which a copy is ordered to be spread upon the minutes of the society, one to be sent to his sorrowing widow, and others to the dental journals of the United States:

WHEREAS, Our departed friend, by his untiring energy, by his constant devotion to duty, has done more than his share for the uplifting of dental education in the United States; and

WHEREAS, A host of his former pupils have each and all lost not merely a teacher, but a true friend, adviser, and counselor, whose constant aim was the betterment of their condition; now, therefore, be it

Resolved, That in his death the dental profession has lost one whose efforts on her behalf have always been elevating, his former pupils have lost a worthy friend, his wife has been bereaved of a loving husband and constant companion; that with all of these we sympathize and mourn, keenly feeling, while far away from our homes and friends, that in his passing away we, too, have lost.

LLOYD F. HAWLEY,
W. G. SKIDMORE,
LOUIS OTTOFY, *Committee.*

The intelligence having been received by the members of the dental profession of Manila that the spirit of the venerable Dr. Geo. H. Cushing had passed away, and recognizing the great loss to the dental profession by reason of his death, and furthermore feeling that the beneficent influence of his long and useful career as a practitioner and teacher is operative in even this distant land, the members of the Manila Dental Society have come together to do honor to his memory, and have adopted the following resolution:

WHEREAS, The Almighty in His infinite wisdom has spared the life of our friend and teacher until, though passed the allotted life of man, he was still in possession of the strength and power of mind to be serviceable as a teacher; and

WHEREAS, The world is better by reason of his busy life, the dental profession richer in her store of knowledge, and the hearts of his friends sorrowful in the consciousness of his departure from among them; now, therefore, be it

Resolved, That the members of this Society, by this action, add their tribute to his worth, express their sincere and heartfelt sympathy to his bereaved family and to the dental profession of the United States, and that this resolution be entered of record, a copy be sent to the family of the deceased, and to the dental journals for publication.

Louis Ottofy,
W. G. Skidmore,
Lloyd R. Hawley, *Committee.*

PERISCOPE.

Oral Sepsis as a Cause of Disease.—I am interested to see that the subject of oral sepsis in certain of its relations was brought under discussion at the meeting of the Royal Medical and Chirurgical Society on June 12 by a paper from Mr. Rickman Godlee.

My excuse for commenting on the discussion must be that the whole subject of oral sepsis as a cause of disease has been one of special interest to me for many years; that I have dealt with it at some length in published papers during the past year and a half;* and that the more I study it the more impressed I am, at once with its importance, and with the extraordinary neglect with which it is treated alike by physicians and surgeons.

I have described cases identical with some of those referred to by Mr. Godlee; and shown—a point not even referred to by any, even the most recent, writers on diseases of the stomach—that not only is the constant swallowing of pus a most potent and prevalent cause of gastric trouble, but that the catarrh set up is not simply irritant but actually infective, and may lead in time to other more permanent effects,—namely, atrophy of glands and chronic gastritis, and in certain cases even to suppurative gastritis.

This result is, however, by no means confined to and associated with any one mouth condition, such as pyorrhea alveolaris. And I specially desire to draw attention to this point, since I note that several of the speakers desired information as to what degree of pyorrhea alveolaris was necessary to produce the various ill-effects referred to.

I have to point out that for every case of gastric or other affection traceable to pyorrhea alveolaris a hundred cases equally well marked are daily to be found associated with other dental and oral conditions of sepsis. In short, I deprecate this subject of oral sepsis and its effects being brought under discussion in connection with any one pathological condition of the mouth. The list of such conditions might be increased almost indefinitely. In my own experience they include not only pyorrhea alveolaris, but stomatitis and gingivitis of every degree of severity—"erythematosa," "pustulosa," "ulcerosa," "gangrænosa," and indeed every other form of trouble, dental and oral, producible by septic infection for which an appropriate adjective can be found. The list, moreover, includes in my experience others for which a suitable qualifying adjective cannot so readily be found, and which I may describe as "foul septic toothplate" stomatitis, "bridge" stomatitis, and "gold cap" stomatitis; this latter group, I venture to think, considerably on the increase in this era of conservative dentistry and high professional mechanical skill.

The important fact to be recognized is that one and all of these various conditions are septic in their nature, and produced by pus organisms; that these organisms are invariably associated with every case of dental caries, however slight; and that the question of effect in any one case is a matter of individual resistance.

The cause underlying them is oral sepsis of the most marked character. This sepsis, moreover, is of a particularly virulent character. For it is connected with disease of bone (that is, of teeth); and a somewhat extensive pathological experience has satisfied me that no pus organisms are so virulent as those grown in connection with necrosing bone.

No physician or surgeon would tolerate for a moment that a patient with a foul septic ulcer, say in his forearm, should from time to time apply his lips to the ulcer to clean it. Yet this is—pathologically—precisely what

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*"Dental Diseases in Relation to General Diseases, especially to Infective Gastritis," *Odont. Soc. Trans.*, January, 1899. "Oral and Gastric Infection in Anæmia," *Lancet*, February 3, 1900.

happens in the case of patients with necrosed teeth and stomatitis. Moreover, the swallowing is constant, and goes on for years, unheeded both by patient and doctor.

I recently saw a patient, a lady, who for twenty-five years had suffered at intervals of every three or four weeks from most inexplicable salivation and subsequent intestinal trouble, so severe in character as to confine her to bed. She had worn for the same period of time a tooth-plate, which she only removed irregularly, and only cleaned with a tooth-brush. She displayed a condition of stomatitis connected with necrosed stumps that was quite remarkable, overlooked as it had been all that time.

I saw recently another patient, also a lady (it is among ladies that the best examples of conservative and artistic dentistry are to be found), who for several years suffered periodically from severe nervous attacks, complicated by gastritis and curious rashes, the whole symptom-complex being regarded as gouty manifestations. I was asked to see her in one of her rashes, and found it a typical blotchy septic rash. Only a month or two before, her dentist, on the strength of the first of the papers below referred to, had insisted on removing a tooth-plate which had partially grown into her jaw, and which had been there for several years. In relation to gastritis and gastric catarrh, such cases could be multiplied indefinitely.

The matter is important, however, not only in relation to gastritis, but in relation to the whole group of infections caused by pus organisms,—*local*, for example, as tonsillitis, glandular swellings, middle ear suppurations, maxillary abscesses; *general*, for example, ulcerative endocarditis, empyemata, meningitis, nephritis, osteomyelitis, and other septic conditions. Whence do they gain entrance into the system? They are not ubiquitous, as was formerly thought. Nor are they necessarily disease-producing from their mere presence; for example, on skin, in the mouth, or in the intestinal canal.

But, given the suitable conditions,—namely, diminished resistance on the part of the tissues, or increase of dose on the side of the organisms,—they are disease-producing. These are precisely the conditions brought about in long-continued necrotic and septic conditions of the mouth.

It is probably impossible to keep pus organisms out of the mouth, just as it is impossible to prevent occasional access of tubercle, typhoid, and other infective organisms. But that fact does not deter us from taking the most exhaustive precautions to keep typhoid contamination out of our water and getting into our houses; or from initiating—as is at last happily the case—measures for preventing access of tubercle bacilli, whether through air or through milk.

I confess I think it urgent, in the interests of the many sufferers from gastritis as well as in the interests of those suffering from pyogenic conditions generally, that some similar steps be taken with regard to the mouth, —the chief channel of access, in my judgment, of all pyogenic infections.

We may not be able to prevent their access into the mouth any more than we can prevent them adhering to the skin. But, knowing as we now do their potential qualities, there is not the slightest reason why the mouth, so easily accessible as it is to local measures, should be made into a perfect hotbed for their development and propagation.

In relation to the whole group of internal conditions caused by pyogenic organisms, I consider there is a wide field of preventive medicine open by the exercise of oral antisepsis, a field that can be worked in, with the most surprisingly satisfactory results, alike by the physician, surgeon, dental surgeon, and patient. And by oral antisepsis I mean no mere rinsing of the mouth with mildly astringent and antiseptic mouth-washes, but (1) the direct application to the diseased tooth or inflamed gum of carbolic acid (1 in 20), repeated daily for just so long a period as the patient will persist in keeping his necrosed tooth or fang, still better (2) the removal of all diseased useless stumps, (3) the most scrupulous daily sterilizing by boiling of every toothplate worn, and (4) on the part of dentists the avoidance of too much conservative dentistry and the use of contrivances like "bridges" which cannot possibly be kept aseptic.—*William Hunter, M.D., F.R.C.P., in British Medical Journal.*

HINTS, QUERIES, AND COMMENTS.

Hydrogen Dioxid as a Local Anesthetic.—On going over the category of dental local anesthetics I fail to find hydrogen dioxid mentioned. I believe Dr. H. E. Kendall, of Sydney, N. S. W., was the first to advocate the use of H_2O_2 as a local anesthetic in the practice of general surgery, he having used it in opening abscesses, puncturing the pleural cavity, even claiming good results from its use in the operation of opening the abdominal cavity.

Having used it for the past two months for the extraction of teeth, I find it to be superior to cocain, eucain, or orthoform, possessing none of the disadvantages of those drugs.

Applied externally it has no anesthetic effect upon the gum-tissue, but injected subcutaneously in doses of from five to twenty minims it produces an intercellular inflation due to the generation of a gas, thereby causing a marked ischemia of the tissue, and the parts are anesthetized immediately. The compression of nerve filaments and diminished blood supply are no doubt the principal factors in inducing the anesthesia.

To obtain the best results it is necessary to observe the following precautions: 1. That the solution of H_2O_2 has not undergone decomposition. 2. That the medicament be injected slowly; if injected rapidly pain may ensue. 3. That there be a complete whiteness of gum-tissue within the desired area.

Hydrogen dioxid possesses the following advantages. It is strongly antiseptic, non-toxic, produces anesthesia immediately, causes no sloughing of the gum, and, last but not least, it is inexpensive.—Charles Vetter, Jr., D.D.S., New York city.

In the September issue of the Dental Cosmos Dr. J. K. Burgess contributes an article on shell crowns. After reading the method adopted by my esteemed friend I desire to offer a suggestion. My method is identically his up to Fig. 4 (except the plate, which I use somewhat thicker). Here I trim up the plate flush with the band, and instead of cutting out the center as he does I leave it intact and make separately a filled cusp. Then the inside of the band is filled with whiting, the cusp and band placed together in proper position and heated until the solder flows. By this method I claim a more accurate result and with much less trouble. Whiting being used in the band before the cusp is attached prevents the possibility of an influx of solder and guarantees a definite and ample thickness of the cusp. —Edward Eggleston, D.D.S., Richmond, Va.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING SEPTEMBER, 1900.

Sept. *1.*—No. 657,199, to Byron E. Lawton. Electric lamp for dental purposes.
" "—No. 657,360, to Frank Ritter. Dental chair.
" *11.*—No. 657,613, to Evelyn Pierrepont. Artificial tooth.
" "—No. 657,633, to Chas. M. Wilcox. Tooth-shell slitter.
" *18.*—No. 658,179, to Jas. W. Ivory. Rubber-dam clamp.
" "—No. 658,193, to Chas. S. Talbert. Artificial tooth.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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ORIGINAL COMMUNICATIONS.

THE VALUE OF EXACT METHODS IN OPERATIVE DENTISTRY.

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(Read before the union meeting of the Seventh and Eighth District Dental Societies of the State of New York, October 29, 1900.)

IN choosing this subject for discussion at the present time I have no disposition to quarrel with present methods of operating, but it is with a feeling that improvement is being made, especially in exactness of methods, and that a discussion of these will be of value.

In order to present my thought upon this subject it seems to me necessary to review very briefly the basis upon which operative dentistry rests to-day. In what we term operative dentistry we include especially the filling of teeth, and it is to this particularly that I shall refer,—the filling of teeth for the purpose of the eradication and arrest of decay; not only the eradication and arrest of present decay, but for the prevention of decay of the teeth in the future.

I shall refer only briefly to a few points upon which our present methods of operating rest, or have rested in the past. Operative dentistry as we know it to-day has had but a brief existence; fifty or sixty years will nearly cover it, for seventy years ago we had not made out the basis upon which we operate to-day; we did not understand the histology of the teeth; we did not have the understanding of caries of the teeth that we have now. Therefore, the basis governing our operations is different, and is differing as we obtain greater knowledge of these subjects. The histology of the teeth was first made out by Tomes, beginning, we may say, in 1835, and ending in 1860, or thereabouts, including in these years the most active work of Mr. Tomes in developing the histology of the teeth. During these years he gave us practically the basis of our present knowledge of this subject. He made out the structure of the dentin, of the enamel, of the pulp, of the odontoblasts, and of the dentinal tubes, and his descriptions still stand as correct, although many details have since been ascertained by others. The application of the discoveries of Tomes in operative dentistry has been very slowly coming about, until to-day we are in a position to use this knowledge as a basis for operating as we have never been able to use it before. The study of caries of the teeth was very vague and empirical before the studies of Tomes. He also studied caries of the teeth, and furnished much of the explanations that we have to-day. It was he who broke down the inflammatory theory of caries, although when he began his studies he seems to have held that notion of the causation of decay of the teeth. But as he progressed with his studies and made out the histological forms and the fact that no blood circulated in dentin, he was convinced that inflammation, as we understand it in other tissues, could not occur in dentin, and came to be a convert, we might say, to the chemical theory that was then being urged by some few persons in the dental profession, although he never fully conceded the chemical theory in all of its bearings. Tomes made out certain differences between caries of the teeth and the softening of dentin by acids that were constant, and these descriptions are as true to-day as when he described them. This difference was an enlargement of the tubules in caries of the teeth which did not occur in dentin softened by acids; also that these tubules contained a granular matter which he could not explain.

With the studies of Magitôt the chemical theory seemed to have been very nearly confirmed, and yet there were facts that required further elucidation and explanation; there were appearances that were not then explainable.

Almost coincident with the studies of Magitôt, and preceding them by a short time in publication, were the studies of Lieber and Rottenstein, which brought into view the possible relation of micro-organisms to caries of the teeth. But these gentlemen wrote too early; before Koch had made his discoveries of staining methods and of the cultivation of micro-organisms in solid media by which species could be separated.

This was followed in 1881 by the publications of Milles and Underwood, who, having the advantages of the staining methods discovered by Koch, succeeded in staining the micro-organisms within the dentinal tubules, and proved the existence of micro-organisms in that position and in that relation to decay, and explained the granular material formerly discovered by Tomes. But these gentlemen failed in the cultivation of micro-organisms.

It remained for Miller, in 1883 and 1884, in the laboratory of Koch, and having all of the advantages of these recent discoveries of staining methods and of the cultivation and separation of the species upon solid media, to discover and explain the causative relation of micro-organisms to caries. He made out the causative relation of micro-organisms to caries so perfectly that his papers will stand as essentially correct through all time, although we have other facts added since, and will have still further elucidation of the subject undoubtedly in the future, for there are many points yet that require clearing up.

During the studies of the time in which the chemical theory was held very many examinations of the saliva were made to test its reaction. It was found generally acid, and this acid was regarded as the cause of caries of the teeth by very many, indeed, most persons in the dental profession. But during the progress of these studies it was found that persons entirely immune to decay had the same acidity of the saliva, and the question came, Why should not the teeth of these persons decay the same as the teeth of other persons who had a similar acidity of the saliva?

After Miller had made out the causative relation of micro-organisms to caries, it was again found that those immune to decay had the same micro-organisms growing in their saliva and the same acidity of the saliva resulting from that growth of micro-organisms that occurred in the mouths of those whose teeth decayed badly. These seemingly contradictory evidences have been discussed and rediscussed, but they have not been sufficient to shake the clear descriptions of the causative relation of micro-organisms to caries that were presented by Miller and have been confirmed so abundantly by others. Why these differences? was the question. This seems to have been answered by a short, offhand kind of expression which grew up apparently in the profession without any one person being responsible for it, viz, "Some people's teeth are better than other people's teeth; some people's teeth are soft, poor in lime-salts, and consequently decay rapidly; other people's teeth are hard and dense, rich in lime-salts, and decay slowly or not at all."

Notice now that the improvements in our knowledge that have stood the test of time have been those that have been made by laboratory methods. This interpretation of the facts which said that teeth were soft in the one case and firm and dense in the other was purely clinical and empirical, an interpretation attempted of the facts seen, but resting upon no reasonable system of proof through any examination of the teeth themselves that was sufficient to determine definitely whether or not this were true.

In 1895 I presented studies of this phase of the subject in which I found that there were no differences in the density of the teeth which accounted for this difference in caries of the teeth. The differences found were so slight that they could not stand in this relation to the differences observed in caries in different persons.

In 1896 Dr. Williams, of London, published studies of the enamel of man and of various animals with reference to caries. These studies showed that imperfections of the enamel did not stand in a causative relation to decay any further than that pits and grooves might give opportunity for its beginnings by serving as points of lodgment, favoring the growth of micro-organisms.

With this we are driven to the hypothesis that the difference in caries of the teeth is not due to any differences in the calcification of the teeth. The hardest teeth will decay in some mouths, while the softest teeth will not decay in the mouths of others. The difference, then, seems to be due to some condition of the saliva that is as yet unexplained, by which micro-organisms are enabled to form gelatinous plaques and glue themselves to the teeth, and thus grow in contact with them and furnish by their growth and life processes the acids which cause the disintegration of the enamel, and thus entering into the tubules carry on their work of destruction. In other cases the condition of the saliva is such that the gelatinous plaques are not formed, and in such cases decay does not occur. But even in mouths that are immune to decay we may make the conditions artificially for the occurrence of decay by placing bands that fit the teeth fairly close and yet leave some room for the growth of micro-organisms beneath these bands, and thus furnish the conditions to hold them in position until by their growth and formation of acids in contact with the teeth the calcium salts of the teeth are dissolved away and caries is instituted. We have, therefore, come to know very intimately the conditions of the beginnings of caries of the teeth.

We have also come to know very intimately that caries of the teeth has its beginning upon certain areas of the crowns of the teeth, while other certain areas, and the largest amount of their total area, are free from the beginnings of caries.

We may divide the beginnings of caries into three classes. Those which occur first (with reference to the age of patients) are what we may term the pit and fissure cavities, occurring in the pits and fissures in the occlusal surfaces of the bicuspids and molars, the buccal surfaces of the lower molars, occasionally the upper when a pit is found there, and in the pits in the lingual surfaces of the lateral incisors; occasionally in the central incisors also. These, I say, are the first to occur as the rule. The second class of cavities to occur are those in the approximal surfaces of teeth. The third class of cavities to occur are those in the gingival third, or near the gum-margin, upon the buccal and labial surfaces of the teeth. These areas of liability to decay are so closely marked that any of us may map them out from our memory of the cases that have come under our care. And the closeness, as to the age of the patient, with which they occur, the one after the other, marks the gravity of the case in hand. If they are divided by considerable intervals of time the case is one easy of management, while if they occur close together in years the case is marked as one difficult of management; or if they occur in young persons simultaneously the difficulty of management becomes extreme. In this case we would say that the susceptibility of the patient to caries is very intense and decay of the teeth is very severe, while if they are much separated in time we will say that the intensity of caries is not considerable, and that the person will generally become immune as maturity is approached, provided the decays that have begun are successfully treated; while if decay does not occur at all in the mouth, we say that the person is immune to caries.*

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*[The descriptive terminology used in this article is in accordance with the office standards of the DENTAL COSMOS, and where it differs from that advocated by the author he is in no wise responsible for the difference in terms employed.—ED. DENTAL COSMOS.]

This expresses in a measure what we would term the hereditary nature of caries. In some families caries of the teeth is very severe, while in other families caries of the teeth is less severe, or may be entirely wanting; the children are very nearly immune. The predisposition to caries usually diminishes as the age of the person increases, and it has now been observed that if the teeth that decay are successfully treated and the persons continue to have the full use of their teeth in chewing food this immunity most certainly follows. But if decay in some of the teeth is allowed to progress, and these teeth become lame in such a way as to prevent the full use of the teeth and the effects of cleaning by their service in mastication, the disposition to caries is increased, or at least the attainment of immunity is prevented.

Now, with the knowledge of the histology of the teeth, and with this knowledge of caries of the teeth and its beginnings, its method of attack and its places of attack, we have the basis for the application of means for its eradication and cure. In all our methods of filling teeth the histology of the teeth, the forms of the enamel prisms, the relation of the enamel prisms to the surfaces of the teeth in their different parts, the strength of the dentin and of the enamel must be considered, and, coupled with this, we must consider carefully the relations of the beginnings of decay to the surfaces, and so apply our means of cure and prevention as to meet these conditions. Therefore, we have in our knowledge of histology of the teeth, in our knowledge of the methods of attack of caries, of the positions of attack, and the positions of immunity of the surfaces of the teeth, the basis upon which to act in the preparation of cavities and in filling teeth. In this we must not forget the hereditary nature of caries, and the fact that we may reasonably expect that with increasing age the patient will become less and less susceptible to attack, provided we have made our operations successfully.

If we should review the earlier beginnings in the filling of teeth we will find that there was but very little of method in the adaptation of fillings to the eradication and cure of caries; the facts we have been stating had not been made out. There was also as little of method in the manipulative field. Each man was a law unto himself, using such instruments as his personal experience dictated, preparing his cavities only with the view to retain the filling-material that should be placed in them. without any guide as to the relations of the surfaces of the teeth to the beginnings of caries, or any guide from the experiences of men as to necessary methods of cutting the teeth or of instruments adapted to his use. It seems that in the earlier years of filling teeth each man formed his own plans without much consideration of the plans of others, and for this reason great differences were found in the methods of manipulation and in the results of the manipulations. A few men seemed to have learned the art of filling teeth in a mechanical way and succeeded well, while the great majority of men who undertook filling operations made a general failure. Not sufficient nomenclature had been formed by which successful men could explain their methods of manipulation or describe the instruments which they used. It has been necessary that a nomenclature should grow up among us and become understood by the members of the profession before these manipulations could be explained. This has been growing and becoming more and more perfect as the years have gone on, until we are arriving at a better position to-day than ever before, so that we may talk with each other more intelligently and understand each other better.

These subjects have been discussed and rediscussed in the past, often in language so vague and in a terminology so imperfect that the persons presenting their views were dissatisfied with their success in making them clear, and those listening often gained but very little idea from their descriptions. The result has been that among different men the methods of operating have been very different, in the instruments employed, in the shaping of cavities, and in the results of operative procedures. It is quite possible that two distinct methods of doing a mechanical operation may both be good methods; it is hardly possible that two distinct methods will be equally good; one will inevitably be better than the other. It is the best method that we wish to attain, and if we should happily obtain the best method of any one mechanical proceeding it would be best that all learn that method. The first proposition in the mechanical execution of filling teeth is that we should so lay the enamel margins of the cavity when prepared that they will be on immune areas of the tooth's surface, or upon surfaces that are habitually kept clean by the excursions of food in mastication. This is a basic principle that should on no account be lost sight of in the preparation of cavities. It includes all that has been known under the phrase "extension for prevention." And let me say here that extension for prevention does not necessarily mean the cutting of large cavities, but it does mean the choosing of the positions of enamel margins and the placing of them in such positions that decay will be least likely to occur along the lines of the enamel margins; and by enamel margins in this connection I mean the outline of the cavity when prepared.

A second proposition is that the cavity should be so formed as to furnish sufficient resistance to the dislodgment of the filling when placed, the strength of the filling-material and the strength of the tooth-substance both being known and carefully considered.

As a third proposition the cavity must be so formed as to be readily accessible and convenient for the placing of the filling-material; for the adaptation of the filling-material to the walls and margins of the cavity is difficult at best, and it is important that every means be taken in the preparation of the cavity to render the placing of the filling as convenient and as certain as possible.

Now a few simple rules, if well learned and applied, will guide us very certainly in the preparation of cavities to the easiest method for ourselves and to the patient, to the quickest method, and to the surest method. These rules may be stated in this way: First, choose what shall be the lines of the cavity margins when complete and cut to those lines, or, in other words, obtain the outline form;

second, obtain the resistance form; third, obtain the retention form; fourth, obtain the convenience form; fifth, remove any remaining decay; sixth, trim the enamel margins to form in relation to the enamel prisms, bevel the cavo-surface angles, and make the toilet of the cavity.

This order of procedure is simple and easily followed, and its strict observance gives certainty of method, rapidity of operating, and regularity to the procedures from step to step; at the same time it is sufficiently elastic to give wide range of choice and invention.

In obtaining the outline form the operator is guided by two prime considerations: First, he chips away overhanging enamel margins or carefully examines superficial areas of decay and obtains a clear conception of the area of destruction in its relation to the area of the surface of the tooth involved. No effort should be made at this time to remove the deeper portions of decay; it is not necessary to even explore the deeper portions of the cavity. The determination of the superficial areas in prepared cavities is the first step, and the whole attention should be concentrated upon that. As soon as the superficial area of destruction is sufficiently determined the case is studied from the standpoint of the future liability to decay, which will be based upon the appearance of the decay in the case in hand, the family history as to hereditary tendencies, the degree of susceptibility of the individual, and the age of the patient. All of this will be considered from the standpoint of the operator's knowledge of the histology of the tooth, his knowledge of the causes of caries, his knowledge of the conditions of the beginnings of caries, and the consideration of the situation and surroundings of this particular cavity in its relation to neighboring teeth and the cleaning effect of excursions of food during mastication. The lines of the cavity margins should be so chosen that they will traverse lines of immunity, or, in cases of a high degree of susceptibility, lines of the least degree of susceptibility to decay. It will be apparent at once that in pit and fissure cavities in the occlusal surface of molars and bicuspids the whole outline will be subject to the friction of mastication, so that the operator will only have to search for lines of the surface sufficiently level to afford a good finish. But when other surfaces are treated the utmost care must be used in the selection of the outline form in all cases in which there is any considerable degree of susceptibility, and always in young persons. This is another expression, or explanation, of what I have meant by extension for prevention. Understand me that extension for prevention does not necessarily mean the cutting of large cavities, but most generally in approximal surfaces, when the laws for cavity preparation have been fulfilled in cases of considerable susceptibility to decay, the cavities are necessarily broad. The exactness with which this may be done by the individual will depend upon his knowledge of the conditions of the beginnings of caries, and calls for the closest study of this in all its bearings. Simply removing all decay, making the cavity retentive and making fillings mechanically fine, is not a high order of operative dentistry.

The obtaining of the resistance form will often be accomplished, in the main, while obtaining the outline form, but will require perfecting later. In this we have the application of the rules of physics. A wise architect would not build a structure designed to carry a heavy weight upon a sloping or rounded foundation, but would build his foundation level and place his superstructure squarely upon it. Just so we must apply similar rules of physics, and seat fillings exposed to the strain of mastication upon a cavity surface cut level in the horizontal plane of the tooth, or at right angles to the line of stress, and square out all angles so that the resistance shall be equal and ample. In many cases we must provide for a stress of from two to three hundred pounds, the amount of pressure that may be exerted by the closure of one lower tooth upon one upper. In any case involving the molar teeth in persons who are able to chew their food well we will have to provide for a stress of more than one hundred pounds. While the retentive form admits of much variation in the different positions of cavities, it must be made on principles of physics; and this, to be exact and safe, must be founded upon a knowledge of the strength of the dentin and enamel and of the strength of the filling-materials used. Much of failure is chargeable to the want of this knowledge. This is true in all positions in which cavities occur, but is most notable in approximal surfaces.

The full exactness of the application of principles in the working out of details of the retentive form is as yet but poorly appreciated. It admits of the widest range of invention, and yet there are definite forms and steps well made out that should be learned one from the other and followed rigidly in the various forms of cavity preparation. Exactness in this is essential to safety in this class of filling operations. In the finishing of enamel walls a very exact knowledge of the minute structure of the enamel is of extreme importance; indeed, this is very important at every step of the process of cavity preparation. Enamel is very hard, and is cut with much difficulty unless we understand it sufficiently to take advantage of its cleavage in any situation. This can be accomplished only by a close study of its minute structure in connection with careful experience in clinical procedures. But it is in the final shaping and finishing of the enamel walls and cavo-surface angles that that knowledge is most essential. The relation of these to the histological elements of the enamel is all-important to the safety of fillings. Usually the enamel wall must be parallel with the length of the enamel rods, and in no case should short ends of rods be left at the cavo-surface angle or forming the outer portion of the enamel wall. But these matters can only be treated in the briefest outline in this paper.

Now, what of technical procedures in these operations? Originally men undertook these procedures without special training for the work, each making his own instruments after his own ideas. A few did remarkably well; many did not do well. From these beginnings present methods have developed almost without system or order in the use of instruments. The general profession have not even words in which to express their manner of the use of instruments or the special forms of their preference for these preparations. With most of these we are unable to communicate our ideas with exactness, for the reason that we have no words which we mutually understand in which to convey the ideas. We know the difference between a hoe and a hatchet, but the idea of the general profession as to what should be called a spoon is vague and indefinite. We have no words in common use in the profession in which to convey an idea of the size, the length, or the angle of the blade of an instrument, of a hatchet, or hoe. It is true any of these can be measured, and their size and length and angle be determined with accuracy, yet how many have had sufficient training in these measurements to be able to speak in terms of measurements of the instruments they use? In this meeting I suppose there are but few. Among some with whom I meet there are many, for this has been the practice with some of us for a sufficient number of years for many to have learned it in such a way that they can speak of instrumentation and of instruments in exact terms, so that they will be understood. In many respects our nomenclature is lame, and we are handicapped in our attempts at the use of language for the expression of our ideas of manipulative procedures. This is a fault that needs mending,—needs mending badly. We need more exactness and more care. This can only be obtained by adopting and learning, or by developing, a technical language suitable to the description of instruments and the technical procedures performed by these instruments. Then we can compare ideas the one with the other. Until then any comparison must be vague and indefinite in the extreme. This is the reason why there is so much of variation, so much of inconsistency, the one with the other, in the operative procedures of dentists to-day. They have no means of communicating with each other understandingly.

To meet this difficulty instrument sets have been devised in a regular order of widths, lengths, and angles of blade, according to definitely fixed formulæ. These formulæ constitute formula names by which each instrument can be mentioned. The instruments are so arranged in their widths, lengths, and angles of blade that with a little experience each individual instrument may be recognized on sight and its name given. This is learned readily by pupils, by assistants, and others, only requiring a few days' experience in most cases, a little longer perhaps in some others, until each individual instrument in sets of forty or more may be mentioned on sight without difficulty. Our dental depots have been simply overloaded with cutting instruments. A multitude of instrument forms have been made with slight and indefinite variations, which are chosen from as indefinitely; and yet our instrument makers have the greatest difficulty in satisfying their customers. Often in the multitude of forms presented the dentist is unable to select forms suitable for the various operations which he is called upon to perform. But by reducing our instruments to definiteness of form we are able to make out a definite set in graded widths, lengths, and angles of blade that will meet every emergency, and yet not have too many.

If we pass to the consideration of the packing of gold in the building of fillings we find the same difficulty. How many of you know the amount of hand pressure in pounds, or ounces, or grams that is required to condense gold and make a filling that is sufficiently hard and dense for the purposes of mastication? How many of you can speak to the other and say how many pounds pressure you use and compare his with yours? None, or practically none, can do this, because the methods of doing it are not sufficiently developed. We do not know how many pounds is required; we are unable to tell one another how many pounds we use, or to understand with any definiteness the relation of the hand pressure of our neighbor to our own.

It is the same with mallet force. We are unable to speak to each other of this understandingly, for the reason that we do not know and are unable to express in words what we do ourselves. When these things are known, and when our training is such that we will be able to speak definitely of these and other things with reference to manipulative procedures that I might mention if time permitted, most, if not all, of what we know as the personal equation in operating will have disappeared. It is quite possible for two men to operate alike if they can understand each other's expressions, but until technical language is developed in which this understanding can be communicated it will be impossible for two men to proceed upon the same lines and produce like results. For instance, suppose we begin a filling with a plugger point that has a diameter of seven-tenths of a millimeter, and change to a plugger point which has a diameter of a full millimeter or a millimeter and a quarter, what will be the difference in the force required to produce the same condensation with the millimeter plugger or millimeter-and-a-quarter plugger as was done with a given force with the seven-tenths-millimeter plugger? When we stop to figure that, most of us have sufficient knowledge of physics to figure out the difference and understand what it would be. How many have thought to apply this to the plugger points used in condensing gold? As I have looked over the clinical procedures of operators, I must say that I think there are very few, and very few will think of this difference unless they have the opportunity of actual trial in which the difference will stand out in pounds.

I have brought with me some instruments for the purpose of pointing out some of these differences and of pointing out ways and means of studying these things, and I will introduce these during the clinic. I am now making a study of hand pressure and of mallet force, the comparison between the two, the pounds pressure required to make fillings of given density, and, further, for the purpose of making out the physics of operative dentistry by strict experimental inquiry. The instruments I have here are instruments for teaching purposes, not especially instruments for scientific inquiry. For strict scientific inquiry we need more exact instruments than these. These are designed more especially for class work, but they are sufficiently accurate for all practical purposes in class work. Indeed, they are fairly accurate in pounds; they are not accurate as to ounces or fractions of ounces. We say they are accurate as we would say the ordinary scales for weighing heavy articles are accurate; they are not accurate as we would speak of the accuracy of chemists' scales for weighing the elements in determining proportions of combinations.

IMMEDIATE ROOT-FILLING.

BY GEORGE W. WELD, D.D.S., M.D., NEW YORK.

(Read before the First District Dental Society of the State of New York, October 9, 1900.)

IN a recent number of the *Dental Brief* a correspondent asks the following question of the editor:

"I would like to have some information on the following condition, which I think you will admit frequently happens, and I am sure I seldom see discussed: In opening up pulp-canals which are more or less tortuous . . . the drill may pass through the wall of the root into the process, resulting in more or less inflammation of a character difficult to control. What is the best treatment?"

This question has prompted the writer to answer the query, and incidentally to touch upon *immediate root-filling.*

Why a dentist who has made even a casual study of physics should employ a drill in opening up canals that are more or less tortuous is beyond the writer's comprehension. And yet we not infrequently hear a dentist say he can accomplish such a task, or read of one who has attempted it. Ask the dentist who makes such an assertion if he would be willing to demonstrate it before a society, and he will likely decline on the plea that he can accomplish things in his own office that he cannot accomplish outside of it. As a matter relating to mechanical law, such an operation can only result in one of two things,—viz, either the drill must "pass through the wall of the root into the process" or it will be broken off in the canal.

There is one dentist in New York city, Brooklyn borough, who gets over such unfavorable conditions by letting things severely alone. In other words, he fills the cavity of the tooth without attempting to drill into the canal, or even to extirpate the pulp or using any kind of mummifying paste. This is probably the simplest of all known methods. When some one asked this dentist what treatment he would prescribe if such a tooth caused after-trouble, he replied by saying that "he would prick the gum, or, if necessary, extract the tooth."

Another dentist in New York goes to the other extreme, and is so scrupulously exact in removing every particle of dead or decomposed pulp and disinfecting the canals that he has said "that in fifteen years' experience he never has had a tooth give *after-trouble* that had come under his observation and treatment."

Common sense demands in all cases that the dentist should carefully remove from the pulp-chamber and the pulp-canals as much of the dead pulp as can possibly be removed with the aid of barbed broaches. Drills, however, should be reserved and utilized only in the incisor teeth, or where there is a direct line of action throughout the entire length of a root-canal.

The query which I have quoted leads up to the question of *pulp-mummification* and *immediate root-filling.*

The following is a formula for a mummifying paste which has been extensively published, and, when employed, of course with unsatisfactory results:

"℞—Dried alum,
Thymol,
Glycerol, āā ℥j.
Zinc oxid q. s. to make a stiff paste."

I will pass around a sample minus the zinc oxid. It will be observed that the thymol is separated from the glycerin. There can be no glycerol of thymol therefore, for a glycerol is made by *dissolving* a medicinal substance in glycerin. Thus a glycerol of alum is made by dissolving one ounce of alum in five fluidounces of glycerin.

The word glycerol, adopted from the French, has become more or less anglicized. The British Pharmacopœia has adopted such a class under the head of glycerina or glycerins, the United States title being glyceriti or glycerites. What the author of this formula probably intended to say was glycerin.

A mummifying agent to be effective in the root-canals of teeth must be powerful enough to quickly coagulate live animal matter. The above combination is only mildly escharotic, and totally inefficient in strength for the purpose for which it was intended to be used.

The success of *immediate root-filling* will depend largely on the germicidal qualities of the agents employed for treatment and the judgment which the dentist exercises in selecting a proper filling-material. As a rule, a tooth containing a putrescent pulp and mephitic gases, partially distended, tender to the touch, with more or less pericementitis, should not be treated to any very great extent at the first sitting. Open up the cavity and remove the pulp in the pulp-chamber only; apply counter-irritation if necessary, introduce a loose pellet of cotton, and dismiss the patient for twenty-four hours. In other words, give the root-canal vent, and give at least partial relief and rest to the inflamed pericementum.

Where the so-called "blind abscess" exists, or where from an internal putrid condition of the root-canal and the pericementum in an irritable condition, a predisposition to inflame makes after-trouble very probable, the condition of affairs may be chronic or subacute. Over-medication or the premature and careless introduction of steel broaches into the canal—in fact, anything which adds the slightest burden to the unhealthy and irritable pericementum—is very apt to lead up to an acute stage, the sequel being congestion, inflammation, and suppuration.

Two other reasons have been advanced against immediate root-filling,—one financial, and the other moral. Not infrequently a patient will remark to his dentist, "Doctor, if you think there is any doubt about this tooth not being quite ready to fill I would prefer to call again, or even half a dozen times." The patient being a wealthy man and eminently able to pay for the extra visits, the doctor is not inclined to discourage the proposition. If perchance after-trouble should occur the patient is less liable to complain, believing that his extra visits enabled the dentist to accomplish all that could be accomplished. But the great majority of people are not able to pay for extra visits, and the dentist of course cannot afford to appropriate his time and labor without just compensation.

Let us consider for a moment the other side of the question. A poor patient calls upon a dentist with a troublesome molar containing a dead and putrescent pulp. With the aid of the dental engine and improved burs and delicate barbed broaches the dentist is enabled in a few minutes to open up and remove the pulp from the pulp-chambetr. If it be an upper molar he can quickly and easily remove the contents of the palatal root-canal, and substitute therefor almost any kind of a plastic filling. Modern methods enable him to disinfect and fill the fine and tortuous canals. In less than one hour's time such a tooth can be rendered aseptic, or at least approximately aseptic, the roots and crown filled, the patient leaving the dentist rejoicing.

Thus a tooth has been saved which the patient had expected to lose, and for a sum of money not much greater than he would have been obliged to pay for its extraction under the influence of an anesthetic. The percentage of after-trouble in such cases is only about two per cent., which, when compared with the actual loss of teeth that have been treated by those distinguished members of the profession who advocate the filling of root-canals with sterilized cotton or other plastic and porous materials, is certainly a very small percentage, and speaks well for the future practice of immediate root-filling.

On this point let me say that an examination of more than one thousand devitalized molars extracted by the dentists who make a business of extracting teeth shows that the suffering and sacrifice were due to a large extent to abscesses which had formed upon the buccal roots of the upper molars or anterior roots of the lower molars. Seldom was an abscess found upon the palatal root of an upper or the posterior root of a lower molar. The reason is obvious,—the large canals are generally rendered aseptic and properly filled. Here is a lower molar which was obtained at one of the extracting emporiums. The cavity was filled with gutta-percha, the pulp-chamber and posterior canal with cotton. An unsuccessful attempt had been made to disinfect and fill the two anterior canals. An abscess formed upon the anterior root, and the tooth was extracted. Just how many visits this tooth paid the dentist or how much money was expended by its former owner for treatment it is of course impossible to say, but the fact remains that the tooth is one of many that are annually sacrificed through the influence and the teachings of the members of the *cotton brigade*.

Immediate root-filling has proved to be practicable, and consequently must be commendable, for the practice means the salvation of thousands of teeth at a moderate cost that would otherwise be extracted; but, as I have already said, its success will depend to a great extent on the strength and efficacy of the mummifying agents employed and the physical qualities of the filling-material that will enable the dentist to fill a root-canal throughout its entire length.

Pulp-mummification is justifiable under unavoidable conditions,—viz, in fine and tortuous root-canals, or where the process relates to shreds of decomposed pulp that may be left in the large canals.

Drs. Schreier, Barker, and Callahan doubtless had in mind the utter futility of attempting to drill out and disinfect tortuous canals when they recommended, respectively, sodium and potassium, permanganate of potassium, and the peroxid of hydrogen and sulfuric acid as adjuncts in perfecting their treatment and the filling of root-canals.

An American in Dublin inquired the way to Sackville Street. The answer was, "You go straight through that crooked lane, round the square, and there you are." Whenever I hear a dentist say that he can open up with a drill and disinfect and fill a root-canal more or less tortuous with cotton or other soft stuff, I am reminded of the Irishman and "Go straight through that crooked lane."

METHODS OF SELECTION IN CONTROLLING THE INFLUX INTO THE DENTAL PROFESSION.

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KAN.

MANY barriers have been erected by the dental profession for the purpose of controlling the influx of recruits into its ranks by the elimination of the unfit among the candidates for the honor of membership. These barriers may be compared to sieves or screens placed across the stream for the purpose of straining out the undesirable material which does not promise the qualities that are requisite to make respectable practitioners. How far these expedients have been successful in accomplishing the end desired by the straining process is a matter of grave doubt,—for the results have been far from satisfactory. Indeed, the rank and file of the profession are uncharitable enough to observe that the average of the candidates entering its ranks to-day is not very much, if any, above the average of those who entered before so many barriers had been erected. This judgment is harsh, possibly it is just, but the impression is widespread throughout the profession. Right or wrong, the conviction is prevalent and freely expressed that the graduate of these latter days is but little, if any, superior to that of a generation ago, notwithstanding the advance in dental education and the elegantly equipped institutions provided for his education and training. Good practitioners were turned out under the old *régime* with comparatively meager facilities. Is the graduate of to-day enough better than his fathers because of the increased facilities and the general advance in dental education?

It becomes interesting, therefore, to inquire into the methods of selection adopted for the purpose of eliminating the unfit, with a view of estimating their effectiveness.

The first barrier that the candidate meets is that of the *preliminary requirements,* so called, for admission to the dental college.

To begin with, the writer desires to say that he has no sympathy with that spirit of wholesale condemnation of the colleges which is abroad in the profession, and which finds expression in some quarters in most unjust, unfair, and ignorant criticism. The denunciation is undoubtedly well deserved by some unscrupulous institutions which were organized mainly for commercial purposes, but the wholesale denunciation of all colleges without discrimination is manifestly unjust. This captious spirit makes no exception of the noble band of efficient, devoted, self-sacrificing, and conscientious teachers whom we all know, and is therein cruelly unfair. It was this spirit of indiscriminate and ignorant criticism that led to the anomalous proceeding of examining graduates by men inexperienced in teaching, who are appointed on the state boards; but of that later. In the writer's connection with several different colleges he has been brought into contact with many college men, and he has found them, without exception, high-minded and conscientious in the matter of admitting students,—and men whose sole aim seemed to be to benefit those under their care, and thereby to elevate the profession. They are painstaking and anxious to enforce the rules regarding the preliminary requirements, and to see to it that no tricks are played as to qualifications, as is so often attempted. The accusation that is made against the better colleges that they admit anyone and everyone, without regard to their qualifications, is maliciously unjust, and is the fruit of a shameless ignorance of the facts.

Having said this, however, the writer must join the chorus of condemnation on one point,—*i.e.,* the present standard of admission. In regard to this the colleges are very derelict, and deserve to be condemned on account of their action in the Faculties Association, which lowered the standard, shamelessly admitting that it was a matter of expediency so that the attendance would not be cut down. That is a defenseless defense, for it practically admits the charge so vehemently made against the colleges that they are organized and run on a commercial basis for financial returns.

It is unquestionably the correct principle that the screen of preliminary requirements should be so finely meshed as to admit only the very elect. The world is not so suffering for dentists that there need be any compromise with the principle, nor any excuse for admitting poor or even mediocre material. While in general education the privilege should be extended to as many as possible, so that its blessings may be widely diffused, the case is very different in a strictly technical school. Of course the majority of dental graduates will be only average men, and will serve only average people in practice, even if the standards are elevated greatly above what they are at present. There is no immediate danger of creating a highly educated and exclusive class of practitioners for whom there would be but a limited *clientèle.* The average man will still be in the majority. But with the constant elevation of the general education of the masses it is manifest that every professional man should have such an education in the humanities as the academies and smaller colleges afford, that he may be master of his faculties and be fit company for other college people with whom he is sure to be thrown into contact. The high-school education is the lowest that should be allowed at present, and the standard should be raised from that to the college grade. Not only should the candidate be well educated in the humanities, as every one must be to fight the battles of life nowadays, but he should also have the elementary training afforded by the high schools and academies in the common sciences,—in chemistry, physics, and biology,—so that elementary training in these sciences need not be carried on in the dental colleges, as is now necessary. This is at present a dreadful waste of time and energy for all concerned. Even the very elementary training of the high schools in the simple sciences would be better than the condition of things that now prevails. And in the humanities the present requirements are so ludicrously low it is small wonder that unfit material is admitted, even when the rule is strictly enforced. The fault is in the low standard, not in the enforcement; the latter is conscientiously executed by all honorable colleges.

An additional method of selection, or straining, that should be inaugurated is that of *mid-term* or *progressive examinations.* It is wrong to allow the student who shows distaste for the profession, indolence, incompetence, or dishonesty to drag along through the term, to fail at the end or squeeze through with "conditions"; or even if he should "skin" through and graduate, and then accidentally pass the state board, to make a dismal failure in practice because he is unfitted for his profession. Examinations should be held at stated intervals in the term to inquire as to the competency of those who are expending time, money, and energy in the acquirement of a technical education, before they are allowed to proceed. The student should be examined and searched carefully as to his attainments and qualifications, and the manifestly unfit, either as to capacity for study, manual ability, or honesty in work,—if deficient in either of these,—should be stimulated to increased exertion or advised to resign. Such barriers by straining out the unfit would save much subsequent suffering to the incompetent and elevate the average of those specially fitted to continue their preparations for their chosen profession. This method is practiced to a degree in the progressive examinations at the end of the first and second years, but there is too much laxity in passing the incompetent at these stages by "conditioning" them. Progressive examinations should be strict and rigid; then warning the careless, stimulating the indolent, urging the hopelessly incompetent to discontinue, and dropping the dishonest would lead to a culling that would be pretty thorough. But the bad habit of allowing an incompetent man to come up and fail year after year is most inconsiderate, if not cruel, for it is well known to his teachers that he can never pass for graduation, and that he could not succeed even if he should attempt practice. The examinations at the end of the first and second years are failures, so far as being barriers for the sifting out of unfit material is concerned; so that other and more thorough progressive examinations should be instituted.

The *final examination* is a more effective barrier, as greater stringency is applied; and this often works great hardship and injustice. The incompetent student is allowed to drift along through the term, wasting his time and money, with the full knowledge on the part of his teachers that he is bound to fail at the last. The meshes of the sieve, too lax at the first, are now drawn tighter, so that he cannot get through. He should have been stopped earlier in the course and diverted from his intention of becoming a dentist, for which he is manifestly unfit. Although the present system therein works great injustice, it cannot be charged that it is too lax at the end. The final examinations are too strict, if anything, for the colleges are in such terror of the state boards that the final culling out is very rigid. The straining and culling should be done at the entrance, and progressive examinations be regularly held afterward, so that every candidate who passes on should be fitted for graduation when he reached it, as he would be if the barriers were effective. Then the students would be honestly dealt with, and the result would be men who would be an honor to themselves, their college, and the profession. The present system is greatly in need of reformation along these lines.

But after graduation what? The new graduate replies with bated breath and blanching cheek, "The *state board!*" This organization is indeed a terror to both the college and the new graduate; and justly so, for its "ways are past finding out." The state board is the latest and most effective barrier for the protection of the profession against the influx of new practitioners that has been erected. It arose from the widespread feeling of distrust and condemnation of the colleges brought about by the sinful acts of a few disreputable institutions. For the sins of the few the whole body is condemned, even while it is conceded generally that it is unfair and unjust to form a judgment of any body or organization from the action of a few members. The Christian Church is not judged by the misdeeds of a few of its professors,—except by those who are its avowed enemies, and they will admit that the principle is wrong. The great mass of its followers are admittedly honest, and accomplish great good. The medical profession, or indeed any profession, is not judged by the shortcomings of its weak members, but by the accomplishments of its best average representatives. Then why should the dental colleges, which are admittedly honorable, be subjected to the humiliation put upon the most dishonest and disreputable without discrimination? The principle is most unjust. The state boards, as a matter of fact, have no moral right to go behind the diploma. It should be their business to supervise the colleges, and then license the graduates without further question. The state boards should be held responsible for the colleges within the boundaries of their states. They should see to it that disreputable institutions are not chartered, and that the existing colleges are conducted upon honest and efficient lines. They should, in fact, dictate dental education, and then be held responsible for it; and the college that does not have the sanction of its state board should not be recognized.

The examinations as at present conducted by the state boards are not fair tests of the candidates' ability to practice. Professional teachers are excluded from the boards, and practitioners with no experience in ascertaining the abilities of students are placed upon them. It too often happens also that notoriously incompetent men are appointed for political reasons only, which makes the whole system ludicrous. So it comes about that the state board, as a barrier for the elimination of the unfit, is uncertain as to its results. The institution fails of its purpose, and the scheme on which it is at present organized will need to be remodeled. As a judge of the fitness of students to practice it is more or less of a failure.

To sum up our estimate of the effectiveness of these barriers, we may conclude as follows:

The first barrier, the *preliminary requirements,* is effective only so far as required by the standard, but that standard is much too low.

The next barrier, the *freshman* and *junior finals,* is ineffective in restraining incompetents, owing to the practice of "conditioning" and the later making up in some fashion.

The next, the *senior final examination* for graduation, is the most effective, when rigidly applied, for the exclusion of the incompetent.

The next, and last, barrier encountered before entering practice is the *state board,* which is more or less effective, but erratic; for the worthy may or may not pass, and the unworthy often slip through.

From this brief review it is readily seen that the present methods of selection are greatly in need of reformation. The average of attainments of the graduate and licensee of to-day is far below what it ought to be, considering the general advance in education, and especially of dental education, and the costly and elaborate equipment devoted to the instruction of those desiring to enter the profession. The dental graduate of to-day ought to be many times better than his predecessor of a generation ago, but that he is really enough better is seriously questioned. The meshes for the straining out of the incompetent must be more tightly drawn. There are a few high-class graduates, but the average is lower than it ought to be.

The remedy is plain enough, namely: Elevate the standard of admission so that the material will be more select, and inaugurate mid-term examinations for the further culling out of the incompetent. Then those who come to graduation day would be the best that our system could produce. As at present managed,—or *mismanaged,*—however, the quality of the output is not worthy of our elaborate system of education.

PATHOLOGY, CHEMISTRY, AND THERAPEUTICS OF PUTRESCENT PULPS.

BY A. H. PECK, M.D., D.D.S., CHICAGO, ILL.

(Read before the union meeting of the Seventh and Eighth District Dental Societies of the State of New York, October 30, 1900.)

Some months ago I was requested by the local society in my home city to read a "five- or eight-minute" paper on the same subject chosen for this meeting, the program of the other meeting consisting of a symposium on subjects properly to be considered in this connection, I being one of four contributors.

At that time I was conducting a series of experiments in connection with the subject-matter which I shall present in this paper. As my experimental work at that time was not completed, I was able in the short time allotted to me only to refer to it. And I wish to state now that two or three lines of thought presented in that paper as *fact* should not have been so stated, because the experimental work followed to completeness has so demonstrated; but as the work stood at that time in its uncompleted form I seemed justified in presenting the thoughts. In this paper I shall avail myself of the opportunity to correct them. This simply serves as a forcible and just reminder that those who are engaged in scientific work of any character cannot be too careful in forming conclusions to be presented to the public. However, when we reflect that "the wise man changes his mind, but the fool never," and again, that "one of the important duties of the scientist of to-day is to correct the science of yesterday," the above does not seem such an unpardonable mistake.

In considering this subject in a systematic way we would first naturally wish to know what constitutes a state of putrescence; what changes in the parts involved are necessary that this condition may be brought about, and what elements, if such we may term them, are evolved and necessary to be destroyed.

By consulting various authors to find a satisfactory definition of this condition a variety of opinions will be found; some asserting positively this or that, others so framing their statements that more or less doubt and uncertainty is indicated.

We find in "Dunglison's Medical Dictionary" a more complete and reasonable definition than in any other. He says *putrefaction* is "the decomposition experienced by animal substances when deprived of life and placed under special circumstances. Such change is now, in the light of modern research, considered as resulting from the action of saprophytic micro-organisms. Presence of water is indispensable; the temperature most favorable to it is from 60° to 90° F. The most common products of putrefaction are water, carbonic acid, acetic acid, ammonia, carburetted hydrogen, and a semi-putrid substance which is volatilized and has an infected odor. State of becoming putrid."

No one denies that the old "chemical theory," if such I may term it, of putrefaction has passed from us never to return. All modern authors on pathological matters are agreed that after nitrogenous matter has been deprived of its blood-supply its vitality is taken away, thus being changed to a state of gangrene; it must be invaded with micro-organisms before the putrefactive process may be inaugurated.

From my experimental work I find it exceedingly difficult, perhaps I should say impossible, to definitely determine just what are the principal gases and various other products that are necessary to be destroyed, and that cause us most trouble when we come to apply our therapeutics.

In the former short paper referred to you will find the statement that "hydrogen sulfid is the chief gas evolved." At that time I thought sufficient proof was shown to justify that opinion, but later I found it to be incorrect. Indeed, one who studies the process of decomposition of nitrogenous matter carefully, and from a chemical standpoint, must conclude that the exact nature of these products of decomposition which yield odor cannot be definitely determined. It has heretofore been generally stated by dentists that the odor from putrescent pulps is due to the presence of *hydrogen sulfid.*

When nitrogenous matter, as, for example, egg-albumin, contains *sulfur, hydrogen sulfid* is undoubtedly a final product of the process of decomposition, and in part must be responsible for the odor evolved. I say "in part" because these nitrogenous substances containing sulfur have been treated in various ways in connection with the putrefactive process, and we have not been able to produce any such odor as sometimes emanates from the pulp-chamber of a tooth.

It is true the human system contains more or less sulfur, and is the supposition an unreasonable one that dead pulps of teeth contain this element, although it may be present in minute quantities? This granted, are we warranted in attributing all the odor encountered in some cases to the evolution of hydrogen sulfid from the necessarily small quantity of sulfur present? Or is the supposition a reasonable one that from a union of various other elements that are present, or products that are being evolved, there is generated an odorous substance other than hydrogen sulfid but the distinguishing characteristics of which in no essential particular differ? I do not feel warranted in making this statement as fact, but from the work accomplished thus far it would seem to be so.

Perhaps, from a purely practical standpoint, it is not necessary that we understand these things. However, he who would treat these cases intelligently and from a scientific standpoint should seek as complete a knowledge of these conditions as possible, so that, knowing the varied therapeutic value of his medicinal agents, he may be able to apply those that are best calculated to destroy these obnoxious products of the putrefactive process.

Again, from a careful chemical study of this process it will be found that ammonia (NH_3) is in all probability the chief final gaseous product, but it is the opinion of the chemists that this is not concerned in the formation of the foul odors. We have also determined that *water, oxids of nitrogen,* and even *free nitrogen,* and, most important among these, *carbonic acid gas,* are prominent among the final products of decomposition.

The foregoing are undoubtedly the principal elements, both pathological and chemical, that are naturally found in connection with putrescent pulps, but these are not all. We are forcibly reminded of this fact when we stop to consider that discolored teeth nearly always have previously contained putrescent pulps, or those in connection with which abscesses have formed; also when we remember that chemical elements other than those already enumerated are in all probability present, and, further, the all-important fact that they are continually uniting only to lose their individual identity, and as a result of these chemical unions certain other elements of an entirely different nature are produced which are directly responsible for the production of other undesirable results.

Of all the metals, iron is no doubt most intimately disseminated throughout the system. An excess of iron may be present in the blood of an individual, and if so the pulps of the teeth will contain their proportionate excess of the metal in the red blood-corpuscles. It is the opinion of chemists that an *excess* of the metal in the system is not necessary in order that the following chemical action may take place. In case of putrescent pulp the red blood-corpuscles are broken up and the iron is set free. This unites with the hydrogen sulfid present, and sulfid of iron is the result of this chemical union. Reflect on the number of discolored teeth that come under our observation, in which it seems certain that the discoloration is effected by some salt of iron.

Is it not a reasonable statement that in individuals who are suffering from ptyalism, systemic poisoning by mercury, more or less of this metal finds its way into the pulps of teeth and unites with a portion of the hydrogen sulfid, the result being the formation of sulfid of mercury? There may be an excess of manganese in the system, or of lead, or other poisonous metals; in which case the sulfids of the respective metals may be found in the decaying pulps. Thus it will be seen there are many elements to be considered and to be gotten rid of in the treatment of putrescent pulps other than micro-organisms and their poisonous products.

Putrescent pulps of teeth of individuals who were suffering with ptyalism and others with plumbism have been subjected to proper chemical tests, with the idea of revealing the presence of these metals and their sulfids. While this work is exceedingly delicate, and I must confess for the most part unsatisfactory as regards the two metals last named, sufficient has been determined to warrant the statements above made regarding these chemical actions and the formation of these sulfids. As regards the presence of iron and its sulfid there is no doubt left.

Before proceeding with the therapeutics of these cases let us consider some of the seemingly mysterious happenings under certain conditions with putrescent pulps. The fact that pulps die in some teeth and lie dormant for months, and even years, without causing trouble, and the further fact that the moment the pulp-chamber is opened and air admitted there is inaugurated an activity that is certainly surprising and seemingly unwarranted, are of interest to us. I have seen cases in practice where seemingly all the processes and changes, both pathological and chemical, incident to putrefying pulps have been inaugurated almost instantly on opening into the pulp-chambers, and notwithstanding that the utmost care has been used in the treatment of them severe apical pericementitis has been caused, and in rare instances even abscesses have resulted. There must be a reason for this, otherwise these cases should yield nicely to treatment, as many others do. I have tried to solve this question by adding fact to our present theory, but frankly confess that I have been able to accomplish little.

There are many classes of micro-organisms that lie dormant, that do not excite fermentation in the absence of oxygen; hence the inactivity of those elements before air is admitted into the pulp-chambers. The moment air passes in, however, the oxygen necessary to arouse to activity these hitherto dormant elements is imparted to them, the varying degrees of activity thus induced being dependent upon the susceptibility and character of the elements present. In the light of our present knowledge the above explanation seems the rational one for the overactivity of those cases as described, but I believe there is opportunity for further enlightenment on this point.

The fact that the crowns of many teeth containing dead pulps, and hitherto not discolored to any appreciable extent, on being opened into, thus permitting saliva and air to come in contact with the decaying tissue, do discolor excessively in a very short time is a not infrequent source of much wonder and humiliation. For example, a patient presents with a tooth containing a dead pulp that is causing trouble. The dentist is occupied with other work, and cannot take the necessary time to make proper treatment. He simply opens into the canal, that the gases which are being generated may escape, thus affording relief to the patient. As stated above, the tooth at this time is not discolored. The patient is dismissed with instructions to return the next day or the day following, when proper attention will be given to the case. At the second sitting it is observed that the tooth is discolored very much, this change having taken place within a very short time. What is the explanation? It is the same line of reasoning as in connection with the overactivity of the micro-organisms in these cases. The various processes incident to putrefaction are intensified when saliva and air are brought in contact with the decaying mass. This seems especially true of those changes or processes which result in the formation of the coloring materials. The reaction, caused by a union especially of the hydrogen sulfid and the oxygenated hemoglobin of the blood, is intensified, thus resulting in the formation of perhaps the chief coloring material, called sulfomethemoglobin, in much less time and in larger quantities than when oxygen is not admitted. The dentinal tubules become saturated with this and other coloring materials, the formation of which is thus unduly brought about. In therapeutic applications to these cases such occurrences must be avoided. He who permits an undiscolored tooth containing a dead pulp to become discolored to any extent after treatment is commenced is certainly deserving of censure in the majority of cases. After treatment is commenced no foreign substances, or even medicament, should be permitted to come in contact with the tooth-structure or the contents of the pulp-chambers except those that are needed to best subserve the interests of the healing art, and that are placed there by the dentist himself. We cannot have impressed upon our minds too strongly the importance of extreme care in this regard.

From all this you will readily appreciate the force of the statement that if we would treat these cases intelligently and scientifically, it is not enough that we simply use a good germicide and deodorant. We must be familiar with the various properties of the medicinal agents to be used, and understand their ability to destroy the many different elements present in this condition.

I would that we could all be first-class chemists, both analytical and synthetic, for then we could subject our medicines to the necessary tests and analyses to determine whether or not they are best suited to successfully combat the various conditions, both pathological and chemical, to which they are being applied; and, failing in this, we might be able to compound a remedy that would better subserve the purpose to which it is put.

If we have a clear understanding of the various compounds that must be destroyed, and also in a general way of the peculiar properties of the medicines to be used that render them suitable agents to be applied to these various conditions, we are able to treat them intelligently, and with a reasonable degree of assurance of favorable results.

There can be no doubt that in the therapeutics of putrescent pulps those medicinal agents that contain oxygen as one of their principal elements, and which are easily broken up, thus freeing the oxygen or a portion of it, are most effective. We must remember that this element oxygen when in proper combination is one of the best agents that we have for the treatment of such conditions as obtain in putrescent pulps, and is one of the best of germicides, deodorants, and bleachers, the three principal properties to be possessed by medicines to be used in these cases. For the reasons cited above I have always contended that the conservative use of such agents as peroxid of hydrogen, hydrozone, and pyrozone constitutes a form of treatment which cannot be excelled for thorough cleansing. I would, however, advise operators to be very careful in their use of these agents in pulp-canals, and especially that they be careful to secure a full opening for the exit of the gas evolved, for if the exit be in any way obstructed it will press through the apical foramen and perhaps carry poisonous material before it to the soft tissues of the apical region, causing trouble.

There is an unlimited number of agents containing oxygen that might be used in these cases, but it must be remembered that only those which readily liberate oxygen at ordinary temperatures—that is, those which contain available oxygen—are effective. Water (H_2O), for example, contains oxygen, but it is not an active oxidizing agent because the affinity between the hydrogen and oxygen is so strong that the latter is not readily liberated under ordinary conditions, as is the case with peroxid of hydrogen (H_2O_2) and the other agents belonging to the same group. In these compounds the combination is very unstable, and they readily break up into H_2O+O, and this nascent O, thus liberated, brings about the strong oxidizing action characteristic of these agents.

Potassium permanganate, with a chemical formula of $KMnO_4$ in proper per cent. solution is a valuable agent in the treatment of these cases. Nascent oxygen is readily liberated, and enters into combination with the various products of the putrefactive process and by oxidation destroys them. As a deodorant it is one of the best agents we have. We may truthfully say that nascent oxygen is the only great chemical purifier. Indeed, this is nature's method of getting rid of such objectionable conditions as those under consideration.

In the short paper before referred to I am made to say that "no medicines should be used in these cases and remain any length of time until the contents of the pulp-canals have been as carefully and thoroughly removed as possible by mechanical means." There is some probability that this statement may be misunderstood. I do not mean it should be our aim to completely remove the putrescent material from the pulp-canals at the first sitting. Perhaps some of us are familiar with the extreme ease with which poisonous material is forced through the apical foramen, causing abscesses to develop. What I meant was that after a portion of the putrescent material has been removed, the medicinal agent placed in the canal should not be permitted to stay more than two or three days before the remainder is carefully but thoroughly removed. If permitted to remain too long discoloration is probable, and not infrequently occurs as a result of the action of the medicine and the various elements contained in the putrefactive mass.

There is an agent, to be used especially as a deodorant, about which we hear little, but it is one which I use with so much satisfaction that I deem it worthy of mention. It is *meditrina.* This is only purified sea-water charged with electricity, and, while a fairly good antiseptic, it is not so potent as has been claimed. Just how meditrina acts as a deodorant I have not by experimentation been able to definitely determine. I think, however, there is no doubt that its virtue in this connection is largely due to the nascent chlorin evolved by it. It is claimed that it enters chemically into combination with the mephitic odors and gases, and in this way effects their destruction. However this may be, the clinical fact remains that it is an excellent deodorant.

In the general treatment of these cases our thoughts most naturally revert to a consideration of the *essential oils.* That we may intelligently use these agents it is not sufficient that we understand only their value as antiseptics and germicides, and their therapeutics as regards soft tissue; we must study them with a view of determining what other properties or elementary constituents they possess that render them useful in destroying the various products of the putrefactive process, as well as the microorganisms and their poisonous products. A study of these oils from a chemical standpoint is a very delicate matter and unsatisfactory in a large degree, as it is difficult to definitely determine facts.

From the United States Pharmacopœia we obtain a partial classification, and I have been able to determine some things in addition. Putting them all together, I am pleased to present the following classification: First, those composed of hydrocarbons only, as oils consisting chiefly of terpenes ($C_{10}H_{16}$), such as oil of turpentine, of lemon, and of camphor. Second, those containing hydrocarbons mixed with oxygenated products, as oils consisting chiefly of cedrenes ($C_{15}H_{24}$), such as oil of cedar, of cubebs, and of cloves. Third, oils consisting chiefly of aromatic aldehyds and allied bodies, such as oil of bitter almonds and of cinnamon. Fourth, oils consisting chiefly of ethereal salts. These may be either (*a*) oxygen salts, as in oil of wintergreen, or (*b*) sulfur salts, as in oil of mustard and of garlic.

The first division, or *terpenes,* being allied to the hydrocarbons, are those composed chiefly of hydrogen and carbon. The second division, or *cedrenes,* means the volatile liquid hydrocarbon found in the oils of this division. They also possess a camphor, which is deposited, the formula of which is $C_{15}H_{26}O$. Thus the benefit of the action of the element oxygen is obtained. You will observe that oil of cloves, one of our most useful agents, belongs to this division. The third division, or those consisting of *aromatic aldehyds*, means the presence of aroma in a class of compounds intermediate between alcohols and acids, derived from their corresponding primary alcohols by the oxidation and removal of two atoms of hydrogen and converted into acids by the addition of an atom of oxygen. Oils of cinnamon and cassia belong to this division. Is not this fact, that they partake largely of the nature of acids, a just explanation of their extremely irritating properties manifested when applied to soft tissue? In the fourth division, or those containing *ethereal salts,* we find oxygen as one of their elementary constituents, as the formula of ether is $(C_2H_5)_2O$. The oils of this division that are of sulfur salts, and which are proper to be used in the treatment of these cases, may be used to excellent advantage after the débris generally of the putrefactive process has been thoroughly removed from the canals, as there is evolved from them a product of the sulfur series, which, in combination with water, forms an excellent bleaching and disinfecting agent.

Whether we are justified in stating, from a purely chemical and scientific standpoint, that special value should be attached to the use of those oils that belong to the oxygen series is a question. I have been unable to demonstrate one point which I had hoped to do, and that is that the oxygen is liberated from the combination, thus furnishing nascent oxygen for action. However, from a practical and clinical standpoint, the special value of this series of oils in the treatment of putrescent pulps cannot be denied.

Some two years ago I obtained a sample of the first lot of synthetic oil of cinnamon received in this country. On experimenting with it in various ways I was much impressed with the activity it exhibited in producing results. This was especially noticeable in its action on soft tissue. Its irritating properties were manifested in less time, and at first in a more vigorous manner, than was the case with the natural oils. I then remarked that this difference in action must be due to the fact that it is a made oil, and that the union between the atoms of the various elements of which it is composed is relatively unstable; so that the compound is readily broken up, thus setting free the various elements and enabling them to act independently and more rapidly in producing results.

Possibly in the not far distant future some of our most available and potent antiseptics, germicides, and deodorants may come to us from the laboratory of the chemist in the form of synthetic preparations.

A METHOD OF TREATING PUTRESCENT ROOT-CANALS AND OPENING FINE AND CONSTRICTED ONES FOR STERILIZATION.

BY F. T. HAYS, D.D.S., CHICAGO, ILL.

I DESIRE to report my experience with a method which I have found both rapid and efficient. Driven to exasperation by the use of sulfuric acid for the above-named purpose, I experimented with a view to finding something which would not corrode every instrument with which it came in contact, and would still act with sufficient rapidity in such cases and insure certainty and expedition.

I have found that nitro-hydrochloric acid, or "aqua regia," does not corrode a steel broach further than to cause a thin coating on the surface, which can be easily removed by a cuttlefish disk. And the same broach may be used to carry the medicament to canals to be left there until termination of the treatment without any fear that the broach may have been weakened and may break off, as is the case when H_2SO_4 is so used. In the treatment of putrescent root-canals with aqua regia an effervescence is produced almost equal to that caused by hydrogen dioxid. This effervescence assists in carrying out and into the pulp-chamber much of the débris lodged in the canals. At the same time an elimination of free chlorin takes place, which helps to further sterilize the canals and render innocuous any putrescent matter that may remain therein, at the same time bleaching the tissue and leaving it nice and white after thoroughly drying out. The bleaching effect of the gas enables the operator to better see the canals and more easily treat them.

I have many times opened into a dead pulp, left the canal open for a few days to drain and that soreness might subside, and at the next sitting subjected the tooth to the treatment as outlined, sealed it up tightly and left it for one week without any inconvenience to the patient. Rarely do I have to treat a tooth by this method more than once thereafter.

I find that I effect a saving of much time to both the patient and myself, and I have cleaner and better canals in which to insert a filling than results from any method heretofore described with which I am acquainted.

As for its use in fine and constricted canals, my advice is to try it and be convinced of the time saved over the old method; besides, one does not require a special broach, as is the case with H_2SO_4.

After using any acid in canals, the residue of acid should be carefully neutralized and the canals dried thoroughly before putting a dressing in them, as this avoids the dilution of medicaments used as a dressing and assists the tissue at the apex to return to normal condition because of aseptic surroundings and absence of irritating fluids to irritate the apical tissue.

My method of procedure is this: Thoroughly exclude the surrounding tissue, preferably by means of the rubber dam; if this is not convenient, have the assistant protect the parts with some absorbent material, thereby excluding saliva and its inevitable consequence, the carrying out over the walls and surfaces of the teeth some of the agent with which you are working, which should always be avoided when working with a corrosive.

Then with a fine, smooth broach, around which have been wound a few threads of cotton, carefully and gradually work the medicament toward the apical end. Use as fine a broach and as few threads of cotton as consistent with the needs of the case, as a broach that tightly fills up the canal acts as a piston, and many times forces septic material through the apical foramen and thereby excludes the possibility of its sterilization by the method outlined; soreness and discomfort, moreover, are sure to follow.

As to any harmful disintegration of tooth-structure, I have never been able to demonstrate that, and I have watched this matter closely as a clinician before reporting. But I do not get the material on the tissue except at the opening of the canal, as the smallest possible amount is quite sufficient; and by due care it can be kept away from where it might do possible injury.

The same care and certainty is often difficult in the use of sulfuric acid "in any degree of concentration," as with it you cannot use the fine broach and cotton medium to carefully place in a fine canal; hence the almost certainty of its spreading over the floor of the pulp-chamber, there to remain until neutralized at the termination of the acid treatment, and to do more injury than need be the case when carefully following the technique of this method.

Again, I have many times used the method here advocated in the canals of anterior teeth that I intended reaming out for a Logan pin, and have tried to differentiate, in the cutting of the tissue immediately around the canal, that portion in which the acid came in actual contact, but could detect no difference so far as my sense of touch could specialize.

I have not as yet made any extensive laboratory experiments, but have used this material freely in roots of freshly extracted teeth, carefully neutralized and dried out, and on splitting open the canals have found them pure and clean, the tissue hard and dense, with noxious odors well dissipated. If by chance the agent should come in contact with the tissue in the apical region I have found nothing more than a persistent tendency to the formation of serum, but have had no trouble from a root filled in this condition if the canals are perfectly aseptic. Of course I should treat such a case more often than suggested, and try to overcome the tendency. But we sometimes meet such cases from some other cause, and find it quite impossible to check the serumal flow when we are called upon to fill the roots and so terminate the treatment.

As to the medicaments to be used for canal dressing, they should be soothing and antiseptic. I prefer oil of cloves, because it produces slight anesthesia of the parts and aborts the condition described by patients as a drawing sensation which follows the use of astringents, and many times lasts for ten or twelve hours. The operator should be thoroughly familiar with the action of whatever canal medicaments he uses, and the conditions in which he should find the canal when he deems the treatment finished and proceeds to fill the canal. Much suffering can be caused by the use of powerful deodorants, which mislead the operator in terminating the treatment too quickly. I use oil of cloves for final dressings because the odor is easily dissipated in the presence of noxious gases and I am not misled, as might be the case with such medicines as thymol and oil of wintergreen. Oil of cassia I have no use for under a sealed dressing.

I offer the foregoing suggestions hoping they may be of value to others under perplexing circumstances. I have no hesitation in recommending the method to the profession. If they will remember the technique and neutralize the agent when through with it I should expect less injury from it than from any similar method, and much benefit to patients who are the unfortunate possessors of fine and constricted canals.

PULP-DIGESTION.

BY A. W. HARLAN, A.M., M.D., D.D.S., CHICAGO, ILL.

(Read before the International Dental Congress at Paris, August 8, 1900.)

In presenting to your notice the subject of pulp-digestion it is my aim to provide a method for removing from the roots of teeth dead pulp-tissue which, through lack of skill or lack of operative technique for its thorough removal, is ordinarily allowed to remain. Many methods of obviating the necessity for pulp-removal have been presented to learned societies, all based on the hypothesis of pulp mummification, and that subject is covered in other communications presented to the Congress.

In looking over the subject of mummification I do not find in the department of surgery any analogy for such procedure as a permanent operation.

I conclude that the destruction of pulps by any method means their removal from the roots before it is a safe surgical procedure to fill them. If this proposition be true, I desire to call your attention to a process for the liquefaction of pulp-tissue in small tortuous roots and those not easily accessible.

In times past the digestion of animal tissue has been accelerated by the use of pepsin or some of its preparations, and of starchy matters by taka-diastase. In the year 1881 Van Antwerp, of Kentucky, discovered that the fresh leaves of pawpaw, or *Carica papaya,* would digest fresh meat, beefsteak, and other animal flesh.

The pulp, as is well known, consists of blood vessels and other tissues, and is dissimilar to any other formation in the body. It is capable of coagulation, and will undergo putrefaction after death, the same as others of the soft tissues. This being granted, we must at once concede that there are teeth having very attenuated and twisted roots where it is almost a physical impossibility to remove all the dead pulp-tissue before the putrefactive process begins.

To relieve us of this operative procedure, I have long been interested in the digestion of such tissue, and will present now the experiments to show the possibility of liquefying such tissues in teeth.

Papain (papayatin), which is obtained from the *Carica papaya,* is now procurable from such manufacturers as Merck, Schuchardt, and others. It is a whitish, somewhat hygroscopic, powder, having the taste of pepsin. It is soluble in water and glycerol. It is active in an acid, neutral, or faintly alkaline solution. It has been used notably in general medicine, diphtheria, in fissures and ulcers, and generally in the domain of surgery as a digester. In stomachic disturbances the best results have been obtained. It is absolutely non-irritating; it is a non-coagulator, and without action on living tissue. The fresh leaves of the pawpaw have long been noted in our country for their softening effect on tough meat, the joints of fowls, etc. My first experiences with pawpaw began more than three years ago. The first requisite in its successful use is to have the pulp dead. It does not act well when made into a fresh paste with water unless it is slightly acidulated with hydrochloric acid, one to three hundred. Its action is slower when a dead pulp has been treated with acids, creasote, carbolic acid, or zinc chlorid. When oils have been rubbed on the surface or arsenical paste has been in contact with a pulp its solution or digestion is not retarded.

I find that pulp-tissue is digested more rapidly if the surface has been lightly painted with one to two hundred sodium fluosilicate, or a solution of borate of soda, one to two hundred; carbonate of soda or magnesia may be used, but not in excess.

If one gram of papain is made into a thick paste with glycerol and a drop of hydrochloric acid solution, one to three hundred, is added it always acts well. My experiments out of the mouth were conducted as follows:

Freshly extracted teeth were taken and the roots enveloped in cotton soaked in distilled peppermint water; the pulp-chamber was opened and the first pulp had the paste applied to it without first touching it with any drug. The remainder were touched with alcohol, zinc chlorid, arsenical paste, oil of cassia, creasote, carbolic acid, and sulfuric acid. As much of the paste was packed into the pulp-chamber as it would hold, and the cavity was sealed and the roots kept moist in a chamber where the temperature was even at 98½° F. These cases were examined at the expiration of twenty-four hours without sensible effect. They were again examined in forty-eight, seventy-two, and ninety-six hours. Complete solution would not take place under ninety-six hours, and if there was considerable pulp-tissue in the root it was usually five to six days before solution would take place.

When the roots of teeth were enveloped in liquid vaselin or in distilled water to which half of one per cent. of peppermint or cassia had been added, the results were almost identical. During the past winter and spring months I used about one hundred and fifty freshly extracted teeth, but found it impossible to digest fragments of the pulp in small or tortuous roots under five to six days. In the mouth, clinically, the papain will act more rapidly, four days being usually sufficient to digest small fragments of pulp-tissue. If a large mass of pulp-tissue remains in a tooth the papain paste must be reapplied at the end of the second day, and occasionally for a third time. I have found from repeated experiments that it is best to remove all tissue in sight, and then pack the roots and pulp-chamber full of the paste and seal with oxysulfate or oxyphosphate of zinc, and let it remain without interference five to eight days. In this way the patient suffers no uneasiness, and there is no risk of pericemental irritation. Putrefaction does not take place in the presence of a solution made in glycerol.

It is needless to remark that this operation must be done under antiseptic precautions from beginning to finish.

THE SURGICAL TREATMENT OF ROOTS OF TEETH BY SPONGE-GRAFTING.

BY GEORGE BRUNTON, L.D.S., LEEDS, ENG.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE diagnosis of absorbed or perforated roots, or of roots which are incomplete, may be made by the X rays or by examination with an instrument such as a Donaldson bristle with a small hook at the end. This, when it is passed up the root-canal, if the apex is absorbed, will be found to pass through, and if retracted the small hook will catch on the end of the root where absorption has taken place. It is well when making this examination to register the length of the root. This may be done by having a small disk of rubber to slide on the bristle. The distance between the hook and the disk, when adjusted to the gingival margin or the cavity opening, will give the length of the instrument which will be required to insert the sponge-graft.

It is obvious that a foreign substance (such as a root-canal point for filling), though inserted with the greatest care, will not prevent the progress of absorption, but will become an irritant. Hence the need for the employment of some substance which is compatible, which will not irritate, and which will enable one to seal the canal perfectly. *Spongia officinalis,* the skeleton of poriferous marine animals from which the gelatinous flesh has been removed, provides a suitable substance to form a graft. The fibrous tissue grows into the fiber of the sponge and forms a perfect natural seal, arrests absorption, and prevents irritation; and enables the operator to fill the canal without risk of further trouble. The sponge used in grafting is the finest Turkey sponge, free from sand, thoroughly washed and sterilized in phenate of soda or other suitable sterilizing agent. The root-canal being rendered free from débris and clean, a small piece of the sponge is, with a suitable probe, pushed up the canal and through so that it spreads out on the wide apex.

The canal is now filled in any way suitable to the case in hand.

A number of cases which have been done since 1888 have been under observation, and no failures have had to be recorded. The following cases were reported in the *Journal of the British Dental Association:*

M. C., aged forty, root of upper right first bicuspid perforated on the lingual side by decay; bleeding difficult to control. Plugged perforation with pledget of cotton wool saturated with chloralum; prepared root-canal, and filled upper third of canal with gutta-percha, then inserted sponge-graft (after removing pledget of cotton) and finished lower two-thirds of canal with the usual gutta-percha point. This case has done remarkably well; not the least tenderness, and no mark on the gums.

Master C. P., aged eight years. Left lower first permanent molar much decayed; pulp putrid; ends of roots incomplete. Root-canals cleaned and enlarged with drill; mopped out with bichlorid of mercury one in one thousand; sponge-graft inserted; canals filled with gutta-percha points and very large amalgam filling in crown at one sitting. The case last quoted was done on May 3, 1892. It has been examined twice a year since then, and is in perfect condition.

Mr. J. F. Colyer, of London, and Mr. Craig, of Leicester, have used this method of treating absorption of the apex with success.

THE TEACHING OF DENTAL MECHANICS IN DENTAL SCHOOLS.

BY E. LLOYD WILLIAMS, M.R.C.S., L.R.C.P., L.D.S., ENG.,

DENTAL SURGEON AND LECTURER ON DENTAL MECHANICS TO THE DENTAL HOSPITAL OF LONDON.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE problem of dental education becomes more and more complex as the need for thorough training presses its claims upon the thoughtful educator; and side by side with the advance of our profession, both in its scientific scope and utilitarian comprehensiveness, runs a strong current, the world over, of earnest and anxious thought and endeavor striving after the best means of making our students good, all-round dentists. An important factor in this education, and one which has possibly not received the attention it deserves, is a thorough practical training in dental mechanics. In my mind it comes first in importance, and for reasons which are not far to seek. The practice of modern dentistry demands, perhaps to a larger degree than that of any other branch of surgery, a nicety of manual dexterity, exacting both in precision and nervous strain. The work itself is often difficult, and the conditions under which it is performed may make it yet more difficult. Eye and hand must be co-ordinated to work smoothly and intelligently, and so to work that stress of circumstance shall interfere as little as possible with the proper performance of the task in hand. I know of no preliminary work calculated to educate hands and fingers in this direction more completely than a thorough course of dental mechanics. But, besides this, the subject should be taught well for its own sake, inasmuch as it embraces a not inconsiderable portion of the practical work which the student will have to do when he is let loose upon a confiding public. I am quite aware that in some directions there is a tendency to narrow down and specialize in a profession which is in its entirety somewhat limited, and ought to be, and some day will be constituted a special branch of surgery; but the average student will certainly object to being cut adrift from mechanics, and will demand the proper means for being made conversant with a subject both useful and interesting in its three-fold aspect of prosthetics, orthodontia, and crown- and bridge-work.

If I have succeeded in securing your assent to the importance of the subject, I invite all those who have dental education at heart, and who have eyes to see what is going on around them, to pause and ask themselves the question, "Is this subject being taught scientifically in our schools?" I know nothing of what is being done in other countries, but I do know pretty accurately the scope of work in Great Britain, and I happen to have a slight knowledge of work of the principal schools of the United States; and, as far as these countries are concerned, I say unhesitatingly that the subject of dental mechanics is a miserable starveling of the curriculum. No one is more ready to admit that in a few isolated schools the powers that be are beginning to wake up, and the sunshine is gradually penetrating their lack-luster eyes. But the rest!—well, they are still asleep, the only sign of life being an occasional snore, as spasmodic and as inarticulate as their mechanical teaching.

Before entering into the subject proper of my paper it may perhaps be advisable to sketch out very briefly the mechanical curricula of the two countries already mentioned. In England every candidate for the L.D.S. diploma is required to spend three years in acquiring a knowledge of dental mechanics, but, inasmuch as the third year *may* overlap one of the *two* years spent in surgical work, it is quite possible that the last year of mechanical work counts for very little; so that we may practically say that the time occupied by the average student is only two years. What a contrast to the five or seven years which in days gone by were not thought too long for a mechanical apprenticeship! Now this pupilage may be passed in the laboratory of a private dentist or in the mechanical department of a dental school. Which is the better place we shall probably not decide. I am certain of one thing, that, given a good teacher, the private pupil has advantages that no school can offer him; while, on the other hand, one cannot close one's eyes to the fact that good teachers are scarce; that premiums are accepted thoughtlessly, if not dishonestly, by men who have neither the time, the ability, nor the inclination to teach, and that the student may drift into the hands of the mechanic who rules the laboratory by rule of thumb. Whether we can dispense with private pupilage is not quite evident. Meanwhile something has been done by the institution of a mechanical examination (undertaken by the student in the early part of his hospital career), when his practical knowledge is put to the test. At present this consists of three hours' practical work in the presence of examiners appointed by the Royal College of Surgeons. By and by I hope that a whole day may not be considered too long for the test, and that the examination may be both theoretical and practical. And then our pseudo-instructors will find that the premiums do not come their way.

Eventually we may come to a compulsory hospital course for every student, while a via media in the shape of a short school course as a supplement to the private pupilage appears to be feasible.

It is only fair to state here that during the latter portion of the time—that is, during the third and fourth years of the curriculum—the student is compelled to attend the clinical department of the school where he is being educated, and make and insert for patients attending six dentures.

Let us now turn to the United States, and there we find that private pupilage is tabooed altogether, and for reasons which appeal to us as being quite tenable, always provided that the substituted college course is efficient. The student there has to learn his mechanical work along with all his other studies during three years, varying from seven to nine months each; so that if we very liberally granted that dental mechanics took up a fourth of his time, and that we estimated the average session as one of eight months, we arrive at the fact that six months are considered sufficient for instruction. But this is only taking a liberal average of all the schools concerned. Let us consider an exceptional case. I visited a dental college in one of the principal cities of America with feverish anticipation, as a visit to the dean of the school had elicited the fact that the instruction there was *nulli secundus*. The school was small, but what of that? Knowledge is not crimped within the vulgar confines of a thirty-story building, any more than a large hat necessarily covers a colossal intellect. I naturally wended my way to the mechanical laboratory, which was an ideal haven of rest for the tired soul: a large, well-lighted, absolutely graceful room, without a jarring sound of any sort; with no teaching staff or attendant of any description, and only one student doing what many students love to do—nothing. The session here was seven months, and a fourth of the twenty-one months' instruction amounted to five months and a week absolutely devoted to dental mechanics under the most peaceful conditions possible. But I forgot to mention that this college was a half-day college, so that the actual time which a man might spend in acquiring the science and art of dental mechanics would be, provided he were assiduous and did not indulge in many holidays, just ten and a half weeks. Shades of the pilgrim fathers of dentistry, just think of it!

I do most earnestly appeal to those of you who care a jot about dental education, and ask, Can nothing be done to make us realize our responsibilities in this matter? I would urge that two full years of ten months each is the minimum time which should be spent in acquiring a practical familiarity with dental mechanics, and that the teaching should be comprehensive, scientific, and thoroughly practical.

And this brings me to our subject proper: How shall we train our students most effectively?

At the threshold lies the consideration of accommodation. The student needs light and air and plenty of room, and the teaching authorities are responsible for limiting their entry of students according to the facilities which they possess for this proper housing. Speaking generally, there is probably no department of education which has made more rapid progress than laboratory teaching. The stuffy class-room where men originally worked, often faked up for the occasion, has given way to the special laboratory, with all its conveniences and comfort, where fresh air is to be had for the breathing, legs and arms stretched to their full anatomical length, and the not too fertile brain of the student given a fair chance.

And next in importance comes the matter of "equipment." A large mansion is nothing better than an empty barrack unless properly and conveniently furnished. The quantity and nature of the appliances to be supplied by the individual student for his own use will probably vary in different schools. The acme of corporate economy was reached in one school which I visited where each student was required to supply his own vulcanizer. There may be an institution where the requirements necessitate the bringing of his own workbench by each man, but this has not come my way yet. But whatever little fact of this nature may obtain, the general equipment as affecting the body of students should be as complete as possible. Genius will probably make its way in spite of bad equipment, and possibly in spite of insufficient teaching also, but what we have to deal with is an aggregate of average capacity, and a well-ordered laboratory is calculated to do much in helping the student to realize that he is engaged in the study of a subject in which scientific accuracy, system, and order play no mean part. It appears to me that the difficulty of teaching dental students lies mainly in the fact that they are imbued with the idea that a minimum amount of dental mechanics is all that is necessary, and if they are turned loose into a laboratory badly furnished and ill-ordered it becomes almost impossible to instill into them at the dawn of their career that earnest spirit of studentship which is the very soul of their professional development. If I wanted to illustrate this spirit of earnestness in a practical way I should like to point to the medical department of the Johns Hopkins University, and ask any of you who are teachers to pay a visit to that school, marking well the tone of the work done there. The secret lies probably in the fact that every student is a graduate in arts before he commences the study of medicine. In other words, he is already a student, and is not playing at the game of how to become one. And if this spirit is in the smallest degree influenced by laboratory surroundings, how much deeper and more real must be the direct influence of the teaching itself.

And this leads me naturally to the important consideration of teachers and their methods. I feel quite sure that at a congress of this sort any very lengthy disquisition is out of place. I therefore propose to touch upon what I venture to believe are some of the salient points, which may occupy us very briefly. My words are intended to suggest rather than to inform. With regard to the subject itself, is it to be treated as a whole, or is it to be split up into the three divisions which, whether wisely or not, are apparently becoming generally recognized,—viz, prosthesis, orthodontia, and crown- and bridge-work? As far as my own feelings are concerned, I think that in a small school it would be a pity to overspecialize in one subject, but when we come to large numbers it may perhaps become a necessity, and possibly an advantage to systematic teaching. In spite of all that can be said against lectures, I cannot help thinking that one course is desirable during the pupilage, and for this reason: The subject of dental mechanics is so essentially practical that a student may become wedded to rule-of-thumb methods; he may become a good workman, but very narrow and dogmatic. A good theoretical course, where the principles which underlie his work are carefully discussed and the why and wherefore pointed out, is calculated to make a man broader and more observant; while it cannot be the slightest hindrance to manual dexterity, which, of course, is unattainable by any amount of theory. But beyond lecture there must be efficient laboratory teaching, and probably the best way of dealing with practical instruction is to have small classes (say of not more than twenty-five), each under the care of a capable instructor. The method of teaching which I think would produce the best results is the one where the demonstrator first explains in a conversational way the subject in hand; then demonstrates the particular bit of work, and afterward superintends the same task being performed by the members of the class.

But we have not yet decided what work the student shall do. If you study carefully the requirements of the various schools you will find that in the preponderating majority the range as well as the standard of mechanical work required from each student is pitiably low, and so profoundly mechanical is the work and so persistently mechanical the setting of the exercises (often performed without supervision) that a piece of work may, by the brotherly kindness of one student, do duty for succeeding generations of students. This practice or "technic" work ought not only to cover a large field, embracing typical examples of most of the every-day appliances which the practitioner will afterward find useful, but the design of the different specimens should be distinctly practical, conforming not only to artistic feeling, but to the actual anatomical as well as mechanical requirements of clinical experience. I have a friendly quarrel with a good many teachers I have come across on this very point. The student has, say, a bar lower to make. It is often not only faulty mechanically, but is so constructed that the case could not possibly be worn in the mouth of the longest-enduring patient. And then I am told that I am insisting on an unnecessary requirement, and that the main thing is to teach the student how to use his hands. To this I reply that you might as well send a student to a school of design, where the exercises were meaningless and purposeless except as manual training. You want to train a student not only to use his hands, but also to exercise artistic feeling. And, above all, you must try to teach him how to work so that the fruit of his education shall be of practical benefit to the patients who by and by intrust themselves to his care. I believe that much of the "shoddy" dentistry, both operative as well as mechanical, which is too much in evidence, is due to faulty mechanical training at an early period of the student's career, when the opportunity occurs of impressing upon him thoroughness, neatness, and exactitude in what are too often looked upon as inconsequential trifles.

Then I would urge that no mechanical pupilage can be complete unless ample *clinical* opportunities are offered to the student of testing at the chair side his efficiency in this class of work. The plaster model and the living oral tissues are neither synonymous terms nor identical quantities, and the student finds that dealing with the patient acts not only as a very lucid commentary on, but adds distinctly to the interest of, his work.

Lastly, I would plead for a very thorough mechanical examination, both theoretical and practical, conducted, if possible, by an independent board, but certainly by some one in addition to the teacher himself. The country which turns out the largest number of dentists in the world still persists in this—I was going to say pernicious system of allowing the teachers to qualify their own students. I know many of their arguments for the retention of the system, and yet I feel sure that if the true educational spirit which is evidenced in certain quarters is allowed to grow, reform in this matter must come to pass. An independent test must eventually produce better teaching. I have already referred to the improved signs in this direction in England. Not many years ago there was no mechanical test whatever, but any one visiting the first examination and comparing it with those of the present day would be struck with the vastly improved quality of the work. What has effected this? First, the recognition by our examining bodies of the importance of the subject, and then the increased attention which our educational bodies have paid to the teaching.

It was customary to look at dental mechanics as almost a lost art. It was never lost, only belittled and neglected; now rising again and claiming an honorable place in an honorable profession.

THE ERUPTION OF THE TEETH.

BY T. E. CONSTANT, M.R.C.S., L.C.S. ENG., L.R.C.P. LOND., SCARBOROUGH, ENG.

(Read before the International Dental Congress, at Paris, August 8, 1900.)

[ABSTRACT.]

THE developmental process which we term "eruption of the teeth" is of interest both to the physiologist and to the dental surgeon. For the physiologist it has the fascination peculiar to an unsolved problem, and, since a factor such as the force which determines the eruption of the teeth cannot be ignored in the consideration of the various problems connected with the etiology of dental irregularities, the question is one which daily obtrudes itself upon the dentist. No apology, therefore, is needed for bringing to the notice of the members of this Congress a theory which, even if it be not a final solution of the problem, at least will afford a working hypothesis for the dentist and will not affront the understanding of the physiologist.

Existing Theories of Eruption and the Chief Objections that have been Urged Against Them.

One of the oldest of existing theories is that the eruption of the teeth is due to the elongation of their roots. The following quotation from an article by Dr. Pierce, entitled "The Eruption and Structural Relations of the Deciduous and Permanent Teeth," in the "American System of Dentistry" (1887), clearly shows that there are some writers who even yet regard this theory with favor. He says: "The absorption of the superimposed tissue from the advancing crown, and the elongation or growth of the root by an increase in the pulpy mass of formative tissue, and its calcification, are the progressive developmental processes which we term 'eruption of the teeth.' The force by which the teeth are propelled toward and through the mucous surface into position is thought by many to be something in addition to that indicated above as the result of normal growth."

In explanation of the eruption of teeth with unformed roots, Dr. Pierce writes in the same article: "The question at once arises whether such premature presentation of the tooth crown is not wholly due to an absorption or wasting of the superimposed tissue, rather than to the elevation of the crown, which could not well take place without the growth of root, unless it were from the contraction or an expulsive effort of the tooth follicle."

The same writer offers the following ingenious explanation of the eruption of teeth with roots that were fully formed some time previously: "There is a mechanical force, however, acting on all such teeth, tending to bring them to the surface, the same as on an unantagonized tooth, inducing its elongation or protrusion from the socket. The repeated closing of the jaws must exert to a large extent this mechanical force, just as the bung in a barrel is elevated by a blow being struck upon the stave on either side of it."

Tomes's explanation of the same phenomenon is not quite so ingenious, but, as will appear later, is not less unsatisfactory. His account of the eruption of a canine tooth of a human female at the age of forty-five is as follows: "Supposing it, then, to be admitted that the tooth was completely developed before the process of cutting commenced, the process itself must be in some respects different from that which occurs when teeth are cut under ordinary circumstances. When the process is normal, as respects time and the stage of development of the tooth, the crown appears through the gum long before the root has attained its full length. The crown is in great part brought toward the surface of the gum by the progressive lengthening of the root, and is afterward still further raised by the same process. Now, when the eruption is accomplished subsequent to the development of the root, the movement of the tooth must be effected by some other means than by the progressive lengthening of the root. The completed tooth has to change its place without itself undergoing any change. The bone which stands in its way must be absorbed, and the lower portion of the socket from which the root of the tooth curves must be contracted by the deposition of the bone. Indeed, in the absence of a better hypothesis, it may be assumed that the gradual contraction of the socket is the means used by nature for bringing teeth to the surface when the process of eruption has been delayed beyond the normal period. In the one case the movement is effected by the development of bone within the alveolus, in the other by the progressive development and consequent lengthening of the tooth."

Another theory that for a time held sway was that of Delabarre. He believed that the passage of a tooth through the gum, or rather its escape from its crypt, is effected in precisely the same manner as is the birth of a child. He regarded the sac attached above to the gum and below to the neck of the tooth as the chief agent in the eruption, and believed that it is by its contraction that the latter is raised from the bottom of the alveolus, and ultimately forced through the dilated orifice of the capsule and gum.

It must have been the improbability of Delabarre's theory that encouraged Coleman to propound another, the acceptance of which would involve the abandonment of existing views as to the growth and development of the jaws. He imagined the teeth to be carried to the surface by a series of "bone currents"; in other words, by interstitial growth of bone peculiar to the jaws, and then laid bare by the absorption of the alveolar margins. The reluctance displayed by our leading physiologists to lay aside their views as to the growth of bone and to accept Coleman's no doubt largely accounts for the modified enthusiasm with which his theory has been received. The greatest objection to it perhaps, apart from this, is that, while it accounts more or less satisfactorily for the eruption of the teeth, it fails to explain how it is that some teeth never do erupt. It is difficult to imagine a lateral or canine tooth stemming the tide of bone currents that its immediate neighbors have found it impossible to resist.

Another theory is that the teeth are raised by a deposit of bone at the bottom of the crypts in which they are contained; and yet another (which is the last to be considered here) is that the teeth are forced into their destined places by contraction of the alveoli. Of these two theories, the latter would only account for the eruption of such teeth as have a single conical root, because in the case of teeth with two or more roots such contraction would tend to retard rather than assist eruption; while the former rests upon an assumption for which, as we shall see, there is absolutely no foundation.

The Naked-Eye Anatomy of Erupting and Developing Teeth, and the Contiguous Parts.

In the jaws of a nine-months' fetus the partially calcified cusps of the temporary teeth are imbedded in soft gelatinous material which is inclosed in bony crypts. The calcified portions of the developing teeth are not at any point in contact with the walls of the crypts in which they are severally contained, but on every side the gelatinous material intervenes. Later on, as calcification proceeds, the cusps more nearly approach the walls of the crypts—which latter do not appear to undergo any enlargement. When the crowns of the developing teeth are fully calcified, the walls of the crypts have undergone partial absorption, the bone covering the cusps of the molars and the labial surfaces of the incisors being removed. Even at this time there is no actual contact between the crowns and the remaining walls of the crypts, the nearest approach to contact being around the sides of the crowns. Between the bases of the crowns and the floors of the crypts there exists a varying but always easily appreciable space filled in with soft vascular tissue, which extends up between the sides of the crowns and the walls of the crypts.

From this time onward, coincident with root-formation, elevation of the tooth crown takes place, and what was the wall of the crypt becomes the socket of the root; but between it and the forming root is the same vascular tissue that separated the calcifying crown from the floor of the crypt. After the tooth crown has emerged from the gum, and before the root is quite complete, the tissue between the upper part of the root and what we should now term the alveolar wall—viz. the crypt wall which has grown up with and around the tooth—loses its gelatinous character, becoming somewhat tougher and more adherent to the root and to the alveolar wall; but it maintains its gelatinous character between the base of the root and the floor of the alveolus. After the root is fully formed the whole of the gelatinous material or the outside of the root assumes the familiar appearance of the peridental membrane.

In all essential points the process of eruption of the permanent corresponds with that of the temporary teeth. The physiological process of absorption which assists in the removal of the temporary teeth is probably identical with that which removes part of the crypt wall to admit of the elevation of the crowns of the temporary teeth.

Dissection of the jaws of the lamb and the pig evidences, from the similarity in the anatomical disposition of the developing teeth and the adjacent parts, that the mechanism of eruption is the same in the case of those animals as in the human subject. The only observable difference is that the gelatinous material is present in greater quantity.

In the case of animals with teeth growing from persistent pulps, it is important to note that the anatomical relations of such teeth are precisely similar to those of human teeth with partially developed roots. In other words, a tooth growing from a persistent pulp has its root imbedded in gelatinous material, and is nowhere in contact with its bony surroundings. It is fair, therefore, to assume that the force which thrusts forward the tooth with a persistent pulp is identical with that causing the eruption of a developing human tooth. From the foregoing description it is evident that the only one of the theories previously enunciated which has any semblance of anatomical foundation is that which states that the eruption of the teeth is due to the elongation of their roots. There is no evidence of "bone currents," of a contractile sac such as assumed by Delabarre, or of a deposit of bone at the bottom of the crypt.

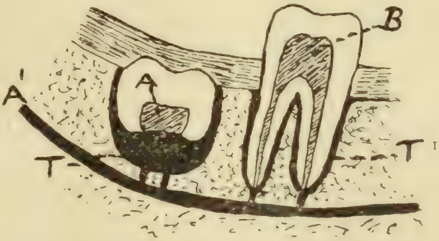
I would here draw your attention to a diagram which represents a specimen in the museum of the Odontological Society of Great Britain. It shows as clearly as possible that the distance of the bottom of the crypt containing the second molar from the inferior dental canal is very little less than the distance of the apices of the roots of the first molar from the same landmark. It is clear, therefore, that the eruption of the first molar could not have been due to bone deposition upon the floor of its crypt. Reference to the same illustration will also convince you that narrowing of the alveoli containing the roots of the first molar would have retarded rather than assisted its eruption. In the case of canine teeth it is frequently found that the crown has half an inch or more to travel before it is fully erupted, while the root is all but complete. It is obvious, therefore, that elongation of root would not account for the eruption of these teeth. We may conclude, therefore, that although elongation of the root of a tooth is almost invariably coincident with its eruption, it is not the cause of it.

It appears to the writer that the chief objection to the root-elongation and bone-formation theories is a physiological one. It is extremely difficult to conceive such a process as dentin formation exercising independent mechanical force! But, granting that it may be so, upon what structure is that force exercised? In other words, to put the matter clearly and concisely, if somewhat vulgarly, what does the root shove against?

Since the forming root is never in actual contact with its bony surroundings, it must necessarily be against the vascular material in which it is imbedded. Now, this tissue appears *post-mortem* of far too jelly-like a consistence to oppose any effective resistance by virtue of its own structure, and yet such resistance there must be or the tissue would be obliterated. Whence, then, are its resisting properties derived? Necessarily from the blood pressure. Therefore, assuming that the physiological process of dentinification *can* exercise independent mechanical force and *is* a factor in the causation of eruption, it must, since action and reaction are equal and opposite, divide the honors with the blood pressure, a factor hitherto quite unrecognized. Indeed, it is obvious that any *vis a tergo* must act through the vascular material surrounding the root, and it follows that such force cannot be greater than the blood pressure or it would cut off the blood-supply to the root.

But is a force other than the blood pressure a necessary hypothesis when we consider the exceptionally advantageous conditions under which it acts? Let us illustrate these conditions by a diagram based upon the previous illustration.

A is the calcified crown of a molar tooth covered above by the soft tissues of the jaw, but otherwise surrounded by bony walls, from which it is separated by a soft and gelatinous but extremely vascular tissue T. This tissue is injected by the force of the blood pressure, entering almost directly from A^1, an artery of considerable size.



B is a fully erupted molar with its roots imbedded in a tissue T^1, which is extremely vascular but is tougher than T, although, like T, it is inclosed by bony walls.

Now, it is obvious that the blood pressure exerted in the tissue T acts upon the tooth crown A at a considerable mechanical advantage. First, from the fact that the tissue is inclosed by the unyielding walls of the crypt, and, secondly, from the embryonic character of the tissue itself. Indeed, it is only necessary to glance at the diagram to understand how it is that some teeth travel so quickly to their destined position when once their crowns have emerged from the gum. In fact, with regard to this point, it is a marvel that dentists, who have many opportunities of observing the rapidity with which teeth sometimes move during eruption, should ever have been induced to regard the comparatively slow process of dentinification as the active agent in the matter.

Referring again to the diagram we find in the case of the fully erupted molar that the space between the roots and the socket is occupied by the peridental membrane, which forms a ligament for the tooth, being attached both to the roots and to the socket. The vascularity of this membrane still endows it, however, with an extrusive tendency, which is in itself sufficient to account for the gradual elongation of unopposed teeth, and is probably the chief means by which the proper occlusion of opposing teeth is maintained. If we have any doubts in the case of healthy teeth as to whether this elongation is due to the normal blood pressure exerted in the peridental membrane, they should surely be dispelled by the clinical phenomena that present themselves when the blood pressure is pathologically augmented; in other words, when inflammation of the peridental membrane supervenes. When we consider the mechanical conditions illustrated by the foregoing diagram in conjunction with the pulsating and expansive force exercised by the blood pressure, does not the necessity for another eruptive force disappear and Dr. Pierce's bung-and-barrel explanation of the elongation of unopposed teeth become somewhat superfluous?

If we assume that the blood pressure, acting in the manner above described, is the sole active mechanical factor in determining the eruption of the teeth, will it account for the phenomena other theories fail to explain? That the crown of a tooth sometimes travels a distance greater than the length of its root; that teeth sometimes erupt subsequently to the formation of their roots, and that teeth with comparatively little roots occasionally erupt, are facts all in favor of such hypothesis, and can be explained by it.

The fact that teeth with fully formed roots remain unerupted can be more easily explained by this theory than by any other, because it alone can account for the space obtained for the fully developed roots which often occupy abnormal positions. In other words, the blood pressure, acting as it does equally in all directions, makes room for the developing root in the direction of least resistance. Normally, this is in the direction of the advancing crown, but occasionally it is elsewhere.

The continuous eruption of teeth with persistent pulps, which neither Delabarre's nor Coleman's theory could possibly explain, is a very simple problem if we admit the blood pressure as the active mechanical factor.

The writer is therefore of opinion that upon anatomical and physiological grounds alone we are justified in assuming that *the blood pressure exerted in the vascular tissue which lies between a developing tooth and its bony surroundings is the active mechanical factor in the process known as the eruption of the teeth.*

So far the purely mechanical aspect of the question has been alone considered, but, if your patience will endure the strain, there are two points of physiological interest that have so direct a bearing upon the subject that it would be as well to include them here.

Some years ago the writer recorded the observation that in young people, when a back tooth had lost its antagonists, the characteristic elongation which takes place under those circumstances varied in cases in which the pulps of the unopposed teeth were dead from those in which they were living. In the former instance, although the elongation of the teeth took place, it was unaccompanied by any downgrowth (or, in the case of a lower tooth, upgrowth) of the alveolar ridge; whereas in the latter case there *was* a corresponding deepening of the alveolar ridge. In other words, in the case of dead teeth there was simply extrusion from the alveolus, but in the case of living teeth there was growth of the alveolar ridge. It appears obvious, therefore, that the growth of the alveolar process is dependent upon the integrity of the dental pulp, or, in other words, that the pulps of the teeth as a whole exercise a trophic influence with regard to the alveolar process. It is the opinion of the writer that extirpation of the pulp of a tooth causes a marked and permanent alteration in the vascular condition of the peridental membrane; in fact, a disturbance of vasomotor equilibrium in the direction of a paralysis of the vaso-constrictor mechanism.

The foregoing remarks apply to both the permanent and temporary dentitions. But the pulps of the temporary teeth exercise another kind of trophic influence which seems to have escaped the notice of dental writers,—namely, their influence upon the process of resorption of the roots of the temporary teeth. In the case of temporary teeth, in which the pulps are destroyed at the time when resorption of the roots should commence, resorption, strictly so called, does not occur at all. In such cases a certain amount of absorption of the root, as a rule, takes place, just as it often does in the case of dead permanent teeth, the macroscopic appearance of the roots in both cases being strikingly similar. This absorption is a pathological process, and differs markedly from the physiological process of resorption. It is a much slower process, and that is one reason why we so frequently find the apices of the roots of dead temporary teeth protruding from the labial or buccal surfaces of the alveolar ridges, causing that ulceration of the mucous membrane of the cheeks or lips with which we are so familiar in the case of children whose milk teeth have been neglected.

The explanation of this common phenomenon is simple. The death of the pulp of the temporary tooth has left its root incapable of resorption, and its socket prone to degeneration. Absorption is too slow a process to make room for the crown of the permanent successor, which soon impinges upon the dead root, deflects it, and thrusts its apex through the degenerated alveolar process and the superjacent soft tissues. In those cases in which death of the pulp of the temporary tooth has taken place some time after the process of resorption has commenced and the root is in consequence shortened, the pressure of the advancing permanent tooth simply tilts the root until it takes a nearly horizontal position, the crown, if any remain, being correspondingly deflected. Other phenomena which admit of a similar explanation are familiar to us all, and need not be enumerated.

From the time when the dental pulp is "nothing more than a part of the mesoblastic myxomatous tissue of the jaw, which has become more rich in vessels and cells than the other neighboring part" (for this euphonious definition the writer is indebted to his distinguished countryman Mr. Tomes, "Dental Anatomy," page 129), up to the time when commencing senile degeneration presages the termination of its physiological activity, it is one of the busiest exponents of local government observable in the whole domain of human physiology. While it is hard at work constructing the tooth it regulates the blood pressure that causes that organ to travel to its appointed place in the mouth, at the same time building up the bony walls that enable that pressure to act at a mechanical advantage. Then, in the case of the temporary teeth, it superintends the demolition of the very structure it has been at such pains to create; and finally, in the case of the permanent teeth, it controls the nutrition of those parts upon the integrity of which the tooth is dependent for the proper exercise of its function. Thus we are able to understand the otherwise inexplicable phenomenon which Mr. Tomes aptly describes in the following words: "It is impossible to insist too strongly upon the fact that the sockets grow up with and are moulded around the teeth as the latter elongate. Teeth do not come down and take possession of sockets more or less ready-made and pre-existent, but the socket is subservient to the position of the tooth. Wherever the tooth may chance to get to, there its socket will be built up round it. Upon the proper appreciation of this fact depends our whole understanding of the mechanism of teething. The position of the teeth determines that of the sockets, and the form of pre-existent alveolar bone has little or nothing to do with the disposition of the teeth."

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 1220.)

SECOND DAY—THURSDAY, AUGUST 9, 1900.

GENERAL ASSEMBLY.

THE meeting was called to order at 1.45 P.M. by the president, Ch. Godon, who requested the honorary president, Mr. George Brunton, of Leeds, England, to preside.

He then proposed that the Committee on Requests and Resolutions be composed of the following members: Drs. Harlan, Cunningham, Grevers, Sjöberg, Aguilar, Smreker, Godon, and Martinier. The proposition was unanimously adopted.

Dr. HARLAN, of Chicago, then read his paper on "Pulp-Digestion."*

The president suggested that Dr. Harlan should give a few demonstrations of his method in the clinic in order to complete his article, which Dr. Harlan agreed to do. The president then asked the honorary president, Mr. Brunton, to express his thanks to Dr. Harlan for his interesting communication.

Mr. BRUNTON. I suppose the absence of discussion is due to the novelty of the subject. For my own part, I remember that about the year 1890 or 1893 Mr. Coles, of London, brought forward a process of digestion of the pulp. He simply used pepsin, as mentioned by Dr. Harlan. I don't think the process then introduced achieved any amount of success, and it simply died out. I have never since heard of any one using it. On behalf of the meeting, I thank Dr. Harlan for his valuable paper.

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*Printed in full at page 1272 of this issue.

The PRESIDENT. The next paper on the program is the paper by Dr. Franck.

Dr. JOHANN FRANCK, Vienna, then read his paper (of which the following is an abstract) entitled

A METHOD OF CONTROLLING HEMORRHAGE AFTER TOOTH-EXTRACTION.

Alveolar hemorrhage due to the abnormal course of the alveolar arteries is often a very dangerous affair. The possibility of the retraction of the arteries is very rare. In cases of this character, if the packing of the alveolus is not successful, our only resource is to ligate the internal maxillary artery or the carotid. This reminds me of the case reported by Thiel, in which the hemorrhage was caused by the rupture of an artery which came out through a foramen in a neighboring tooth. Similar cases are, however, extremely rare. The services of the dental surgeon are demanded when we have to deal with cases of hemorrhagic diathesis. The number of diseases connected with this diathesis are very numerous. For example, pernicious anemia, leukemia, scorbutus, Walkhoff's disease, and hereditary hemophilia; also such septic disorders as diphtheria and typhoid fever. This tendency is clearly demonstrated in phosphorus poisoning and probably in the intermittent form of hemoglobanemia, and which is considered as secondary to methemoglobanemia; also in conditions which accompany certain cases of poison,—*i.e.*, mushroom poisoning and the poisoning by potassium chlorate.

The services of the dentist are never solicited for the treatment of this class of cases. You will see that patients suffering and confined to bed with these grave and acute disorders would be treated for toothache arising under those circumstances by the general surgeon and not by the dentist.

Of all of the disorders before enumerated, the only one which the dentist is liable to meet is inherited hemophilia, and which, by reason of its chronic character and the absence of all clinical manifestations, excepting the tendency to hemorrhage, is the one which is of greatest importance to the dental practitioner. The hereditary character of this disorder is a demonstrated fact. The proportion of hemophilics is greater among women than among men, in the ratio of one to thirteen. The children of hemophilic patients are in general of a normal constitution. The anatomical and physiological cause of this disease is shrouded in darkness. Microscopical research and chemical analysis have thrown no light upon the etiology of the disorder. One school believes in the coagulation hypothesis, another in a lack of tonicity in the vascular coats. Virchow believes in the hypothesis of a high arterial pressure due to a thinness of the vascular coats. Others believe in a conjoint effect of the several causes enumerated. I entertain the belief that the diminished power of coagulation in these cases is an assured fact.

In the few cases examined by Zoege Manteuffel, the blood of hemophilics coagulated in four and a half minutes, whereas, after the addition of ferments, the same blood coagulated in ten seconds.

As we all know, insignificant lesions are often the cause of hemorrhage. This is probably due to rupture of the arterioles, but we are lacking in anatomical proof sufficient to establish this hypothesis. Following the extraction of a tooth we have a capillary hemorrhage. In hemophilic patients, who have died following the extraction of a tooth, the failure of the ruptured arterioles to close has not been demonstrated. In some cases of thymicus lymphaticus, associated with a persistent thymus and contraction of the arteries, hemophilia has not been observed.

For the treatment of this disorder, among the internal remedies used are salts of calcium. They possess the property of rapidly and directly coagulating the blood, but they must be administered some weeks before the operation. This is an impossible procedure in the practice of our profession.

The hemorrhages following dental extractions are usually very active, but of short duration. The refrigerating method in combination with cocain treatment has not been generally successful. Ethyl chlorid congeals the blood, but when the refrigerating action has passed off the hemorrhage returns. The use of the cautery should be abandoned. It is unfortunate that the general surgeon persists in the use of this method.

The only possible methods of arresting hemorrhage are the following:

I. *Injections of hot water.*—This method has been demonstrated by Mr. Scheff, Jr. Henry Finch observed three cases in which this method combined with venesection was successful. Snegiriceff has introduced into the alveolus with a glass syringe a jet of steam, but this method should be rejected because of the great pain which it produces.

II. *Hypodermic injection of gelatin.*—In a case of excision of the tonsils Dr. Heymann used cold and compresses of ferripyrin without effect. Two and five-tenths per cent. gelatin dissolved in salt solution (0.7 per cent.) forms a preparation in which the red blood-corpuscles undergo no change. One hundred and forty-five c.c. of this solution at 40° C. were injected under the skin of the chest. After three-quarters of an hour the hemorrhage was arrested. The dressing was changed at the end of thirty hours. Secondary hemorrhage occurred. This was treated by further injection consisting of 240 c.c., and the following day 160 c.c. There was no recurrence of the hemorrhage.

Legrand recommends the following solution, to be warmed previous to injection:

Pure gelatin, 2.0 gm.;
Sodium chlorid, 0.70 gm.;
Crystallized carbolic acid, 0.70 gm.;
Eucain hydrochlorid, 0.70 gm.;
Cocain hydrochlorid, 0.30 gm.;
Distilled water, 100 gm.

III. Zoege Manteuffel obtained good results with the *solution* *of Thromb* and the *ferments of Schmidt.* It should be observed, and it is surprising, that in cases of parenchymatous hemorrhage the use of strong compresses is of no value. In cases of hemophilia, in order to arrest hemorrhage from the alveolus, plugs of wax, plaster of Paris, and even lead in the form of compresses have been used. Numerous and very ingenious appliances have been invented for the purpose of retaining these compresses in the alveolus. Niemeyer's appliance is the one which should be most generally known, as very good results are obtained from the use of this appliance. Tillman recommends that attention should be paid to the compressing bandages. These bandages, when properly applied, hasten the coagulation and prevent the removal of the clot when formed. In order to bring about coagulation in hemophilics a very strong compress should be used. Thiersch treated a case of hemorrhage after extirpation of an atheromatous growth by filling the wound with clotted blood, covering it with a bandage of absorbent gauze; in this way he protected the clot. After the thirty-eighth day the coagulum separated, and the surface of the wound was found to be completely covered with new tissue.

I have always endeavored to avoid the occurrence of hemorrhage in my treatment of hemophilic patients. After extraction I packed the alveoli with iodoform gauze, which is covered by a ball of cotton and retained in position by rubber dam, which is attached with strong ligatures to the neighboring teeth. This retains the gauze compress in place. The redundant portions of the rubber dam are cut away. This method prevents pressure on the wound; the ball of cotton retained by the rubber dam holds the compresses, and the pressure over the alveolus is not stronger than the ordinary blood-pressure. Second, the arrangement permits irrigation of the mouth. The patient can take the necessary food. In the majority of cases which have been quoted a plug is put between the two neighboring teeth, and in order to hold it in position in the lower jaw a bandage is applied which fixes the lower jaw against the upper. In a case treated after this method it was deemed necessary to extract an upper incisor tooth, in order to afford space through which the patient might be able to take food. As a consequence of this kind of treatment a patient cannot cleanse the mouth, and severe stomatitis results, which places the patient in a dangerous condition.

All these defects are prevented by the use of the method which I have described. Food can be easily taken, and the mouth can be disinfected daily by means of appropriate liquids. The ball of cotton is changed every week. This operation is to be performed with a great deal of care.

I consider that the slight periostitis that results from this treatment helps toward the recovery by stimulating healthy granulations. The only drawback to this method is the necessity for having neighboring teeth to which the rubber dam may be attached. But this is not a serious drawback, for the reason that the first extractions are usually performed on the molars or bicuspids. Many extractions would be avoided if the hemophilic character of these patients were known. Even though one may have arrested the initial hemorrhage, the danger of a secondary outbreak is a grave one, and should never be lost sight of; and the mission of the surgeon is not fulfilled unless these secondary outbreaks are guarded against.

Discussion.

Dr. Poinsot. Dr. Franck has referred to the causes which bring about hemorrhage, but he did not give us a general symptomatic description of a hemophilic patient. The greatest troubles are sometimes the consequence of an insignificant operation. Sometimes the extraction of a loose root is the cause of a profuse hemorrhage. We question how such a small cause can determine such a great effect. The reason is a simple one. Those who have seen Luc's operation have observed the same phenomenon. This condition also takes place in the curetting operation of the maxillary sinus. As soon as the antrum is exposed a profuse hemorrhage ensues. To arrest it the antrum has to be packed very tightly with iodoform gauze. The tampon is then removed, and the operation is continued. The hemorrhage reappears; then the sinus is again packed, and this procedure is repeated two or three times. Those who are not accustomed to this phenomenon become frightened at the sight of so much blood, and they are very much surprised to see that as soon as the sinus is curetted the hemorrhage stops. The same phenomenon takes place in the practice of our profession. When we have to deal with a root in a pathological condition, a root with small neoplasms attached to it, we will have a hemorrhage if the root and cyst are not removed at the same time, while no hemorrhage takes place if the cyst accompanies the extracted root.

Dr. Schwartz, Sr. Are the hemorrhages consequent to dental operations instantaneous, or do they take place a few days after the operation? I will remind you of a note that I sent to the *Journal d'Odontologie* describing the following accident: A child had been operated upon on Wednesday evening, and an excessive hemorrhage began on the following Saturday. I would like to know what Dr. Franck thinks of this fact.

Dr. Franck. I said that sometimes the extraction of a loose root was the cause of profuse hemorrhage. In such cases coagulation does not take place. I have studied the question, and that is the only reason that I can discover. If something is left in the alveolus, that common condition which we all know takes place,—by this I mean bleeding from the capillaries. This may come from an arteriole or from a large artery. If there is a rupture of these vessels the hemorrhage can be arrested by suturing the rupture. But in those cases where the hemorrhage begins immediately after the extraction of a root, or after the performance of a small operation, every effort to stop the hemorrhage is of no value. This secondary hemorrhage begins six or seven hours after the operation. The first hemorrhage is easily arrested, while the second is arrested only after many efforts. When the hemophilia is of a mild character any method may be successful, but when the case is a serious one all the methods employed become of no value.

Discussion closed.

Dr. J. LEON WILLIAMS, of London, then read his paper entitled "Notes on the Enamel of the Teeth of the Marsupials and of Other Animals Having Tubular Enamel."*

SECTION I.—ANATOMY, PHYSIOLOGY, AND HISTOLOGY.
SECTION II.—SPECIAL PATHOLOGY AND BACTERIOLOGY.

[JOINT SESSION.]

The president called the meeting to order at 4.20 P.M., and announced that all the papers belonging to Sections I and II would be read at that meeting. He then said:

Yesterday Mr. Hopewell Smith read a very interesting paper.† Several members asked that the conclusions should be translated and read in French. I had the conclusions translated, and now I will read them. (The president read the conclusions reached in Mr. Hopewell Smith's paper.)

The president then called on Dr. MICHAELS, of Paris, to read his article on "Sialo-Semeiology." Dr. Michaels's paper was an elaborate and lengthy communication, which was not read in full, the author giving a condensed epitome of it. An abstract follows:

ON SIALO-SEMEIOLOGY: ANALYSIS OF THE SALIVA AS AN AID IN THE DIAGNOSIS OF DIATHETIC DISEASES AND GINGIVO-DENTAL CHANGES.

The essayist in the preface to his communication explained that the motive for his research arose from the fact that there were certain problems in dental art concerning which we were much in the dark from a lack of knowledge of the histo-chemistry of the oral secretions, especially in the mouths of those suffering from the several diathetic conditions.

As a prelude to his work it became necessary to investigate the histo-chemistry of normal saliva, concerning which subject the literature is very meager. It became necessary therefore to pay especial attention to the saliva, its essential physical and chemical properties and its changes in composition, and the relation of these factors to pathological states. It was found that the saliva, like all recrementitious secretions, is liable to physiological oscillations in constant relation to the changes in the humors of the body. The saliva is swallowed as soon as it is produced; its emission is followed by a new absorption, and this results in the formation of a sort of circuit very interesting to notice, and of which account must be taken, for the passage of the saliva into the blood effects under normal conditions a sodium combination; while it is eliminated in a condition which varies, at times being acid and at other times alkaline or neutral. On the other hand, every crystallizable chemical principle, every acid, alkaline or neutral salt, even the alkaloids, biliary pigments, or the free acids, circulate in the plasma in variable proportions, and are found in the saliva in certain diathetic phases. The organoleptic properties of normal saliva are not characteristic except when compared with diathetic saliva, but in studying the differences we learn quickly to recognize and distinguish one from the other. By reason of the numerous characteristics which saliva presents in the different conditions of health the following problems have arisen for consideration:

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*Dr. Williams's paper was not received in the report furnished to the DENTAL COSMOS.—ED.

†*I.e.*, the paper printed in the DENTAL COSMOS for November, page 1097.

1. What are the principles which differentiate physiological from pathological saliva?

2. Is there any correlation between the chemistry of saliva and the different diathetic states?

3: Does the cacochymic state produce morbid saliva capable of influencing the gingival dental tissues?

4. Does saliva follow the biochemical oscillations?

5. Is the composition of the saliva simple or complex?

6. Is it possible to establish a classification of the organoleptic characteristics of saliva, and refer them to particular conditions of health?

7. Is it possible to point out the causes of the variations of saliva?

Certain salivas are clear, liquid, and transparent, while others are viscid and thick. Some are reddish, yellowish, or greenish in color, while others are as clear as water. Some have a great quantity of froth; others have very little, or even none at all. In the space of two days some kinds decompose, while others even after a year have no odor. Chemically, some contain sulfocyanids in different proportions; others do not contain any at all. In some we find crystalline salts; others have none. Certain salivas contain fatty substances or emulsions, and others biliary pigments or urobilin.

In a hundred samples of saliva of different origins preserved in sealed tubes, after several days a series of colorations will probably appear (six or seven very distinct ones have been found). These can be classified according to diathesis. These colorations characterize the presence of certain principles,—biliary pigments, or principles which determine the diathetic state.

Dr. Michaels's study comprises the examination of three types of saliva: First, of normal healthy saliva; second, of that of a hypoacid diathetic individual; third, of that of a hyperacid diathetic individual. Investigation was also made of the functions of the liver, of the biliary principles, the influence of changes, and the presence and absence of these principles in the blood-plasma and in the salivary secretion. The essayist regarded this phase of the research as of grave importance, for the reason that among the substances which he had discovered in the saliva through chemical analysis a great majority came from the liver. The presence of these substances in the saliva is significant, and gives importance to the study of the function of the hepatic toxins.

The results of Dr. Michaels's study tend to show that the pathological modifications of the saliva are in direct relation with diathetic conditions. The technique of the study was most elaborate and carefully carried out, and, while it involved much labor, time, and care, is not regarded by the essayist as by any means exhaustive or final. The essayist defines diathesis as "a general disposition of the organism by virtue of which the individual is attacked by one or different determined diseases through a pathogenic cause, which brings about the morbid condition of the blood. The tissues and secretions depend upon the blood-plasma; a dyscrasic condition modifies the forces of the economy and produces local or general manifestations capable of taking place alternately and successionally. Abnormal vital processes end in man in two ways,—hypoacidity and hyperacidity.

The first state (*lymphatism*) is the expression of a vital overactivity having as its consequence the contagious diathesis as in scrofula, tuberculosis, syphilis. The oxidations are overactive and the hydrations in excess of the normal, hence there is a decrease in organic acids and an increase of saline chlorids excreted by the economy. Hypoacidity, according to Ducloux, favors the chemical changes in the tissues. In the hypoacid diathesis all the oxidations are exaggerated, and in consequence above the normal.

The second state, hyperacidity (*arthritism*), is the expression of a decrease in vital activity, from which result the diathetic states as in gout, rheumatism, sclerosis. The oxidations are incomplete, and as a consequence there results an increase in the quantity of organic acids. Hyperacidity is a particular state of the organism characterized in a general way by slowness in the biochemical changes. The reaction of the blood with the ordinary reagents (litmus, for example) is normally alkaline, but if we study the distribution of the acids and bases of the blood-plasma we see that the reaction is really acid (Gautrelet, Douin, and Hugounenq); and this acidity is increased, and the blood may become decidedly acid by the accumulation of the acid waste products which are not eliminated. The secretions and excretions become then of acid reaction. It is for this reason that a certain number of chronic diseases have constant characteristics in regard to semeiology,—an increase of the normal acidity of the urine, as well as an increase of the normal acidity of the saliva.

The conclusion to be deduced from the foregoing is that as long as we have not discovered the cause of morbid states (immediate and mediate alteration of tissues), and as long as we have not made a more serious study of the essential factors of biochemistry and of the relations of diathesis with the salivary excretion, we will not be in a position to explain in a precise way the morphological differences of dental caries.

After giving a description of his technique and the history of previous work in this field, with an account of the substances found in normal as well as abnormal salivas, the essayist presented a tabulation of his investigation of normal and diathetic salivas, showing the number and character of the cases studied. (The table is not reproduced here for lack of space.) The repeated studies made by the author with respect to the composition and characteristics of pathological salivas have enabled him to easily distinguish the several diatheses from an examination of the saliva, which he finds shows special characteristics for each diathesis.

Theoretically, the idea of a physiological saliva where all the biochemical principles are in a state of equilibrium is probably easy to conceive, but in practice its realization is very rare; that is to say, the saliva of a human adult without diathesis and with healthy teeth is but seldom found. The author's analyses showed an interesting relation between the proportion of ammoniacal salts and sulfocyanids with reference to dental caries, his deductions upon that point being as follows: In the hypoacid state ammonia exists in greater quantities than the sulfocyanids, and dental caries is active or rapid according to the diathetic period. In a healthy state the sulfocyanids and ammonia are in equal proportions and in small quantities, and there is immunity to dental caries. In the hyperacid state sulfocyanids are in greater proportion than ammonia, and there is immunity from or but slow progress of caries. Uramid (oxaluric acid) produces the diathetic variety of caries. Potassium in combination with a sulfocyanid provokes abrasion of the teeth. The importance of the significance of these nutritional waste products in the bodily fluids and excreta as diagnostic of diathetic and diseased states was practically demonstrated by the author, he having been able to make a diagnosis from specimens of blood 1 c.c. in quantity, 5 c.c. of urine, and an equal quantity of saliva. His examination showed the case to be one of cancer in the cachectic period, which diagnosis was confirmed by the hospital surgeon who had the case in charge and furnished the specimens for examination.

After a presentation of his work in the investigation of the saliva of gouty and rheumatic cases, the essayist presented the following conclusions with regard to the chemistry of the saliva:

1. The analysis of salva is of importance for the diagnosis of chronic affections (diathesis).

2. The saliva contains every soluble and crystallizable principle which is found in excess in the blood-plasma, and which is susceptible of being dialyzed through glandular activity.

3. Every chemical principle—salts, acids, and alkaloids in solution—in pathological saliva is found on histological preparation after precipitation and crystallization by means of spontaneous evaporation or active drying of the liquid, in the form of crystalline bodies or determined spectral lines, first by the form, second by the coloration in the micro-polariscope. The salts formed in this way are always identical for the same diathetic states, but their coloration varies according to the intensity of the different periods of the diathesis.

4. The diagnosis of a diathetic affection can be established by the following elements which the analysis of the saliva provides:

(1) The observation of the differential characteristics of the chemical, physical, and organoleptic properties.

(2) The analytical procedure (reagents, microscope, and micro-polariscope), which enables us to discover the organic alkaloids, acid salts, urobilin, biliary elements and pigments.

(3) The presence of acid salts in the saliva visible by polarization indicates a hyperacid diathesis.

(4) The presence of crystalline salts invisible by polarization but visible under the microscope characterizes the alkaline chlorids which indicate a hypoacid diathesis.

(5) The saliva of adolescence contains a dextrinic principle (glycogen) susceptible of fermentation under the influence of ptyalin in the presence of earthy salts. In this way is obtained the dissolution of the earthy salts by the substitution of lactic acid for carbonic acid.

(6) The saliva contains definite chemical principles which arrest or retard the progress of dental caries (sulfocyanid of ammonia).

(7) The alkaline sulfocyanids arrest the formation of putrefactive fermentation.

(8) Chemically, dental caries is a disease of demineralization, due to the presence of an excess of acid principles in the saliva having a greater affinity for the chemical constituents of the teeth.

(9) The chemical affinity of potassium and sodium is greater than that of the earthy alkaline bases in combination with acid salts.

(10) Lactic acid possesses a greater affinity for calcium than does carbonic acid.

(11) Active dental caries characterizes the hypoacid diathesis.

(12) Diathetic dental caries (gout and diabetes) results from lactic acid fermentations.

The president tendered to Dr. Michaels the congratulations and thanks of the meeting.

Dr. FREY referred to the important *rôle* of biochemistry in the discussions of pathological questions. Biochemistry has played an important part in the works of Professor Hayem on the pathology of the stomach. Dr. Frey also spoke about the analogy which exists in regard to this question between the works of the physician and the dentist. One studies the action of the urine, the other the action of the saliva; and they will see the relation between the different phenomena. The studies of Dr. Michaels are exceedingly interesting, and they will give without any doubt very remarkable results. The study of the chemistry of the saliva is an entirely new thing, and has begun now just as the chemistry of the stomach, blood, etc., began a few years ago.

The president then called on Miss FREY and Dr. FREY, who presented the following

SYNOPTIC TABLE ON THE ETIOLOGY OF DENTAL CARIES.

The question of the etiology of dental caries, after having been considered solved, has again become the subject of important discussions. This confusion began on account of the contradictory views of Galippe on the one side and of Black and Williams on the other. This is why we have formed a table of the problem to be resolved. This is the only purpose of our work.

I. *General Predisposing Causes.*

A. *Age.* All ages, from the third year, for the deciduous teeth.

For the permanent teeth, adult age more than old age: law of Galippe. This law of Galippe has been judged as being doubtful by Black (DENTAL COSMOS, 1895, and June, 1898) and Williams (DENTAL COSMOS, 1898). They concluded from their observations that the proportion of organic and mineral materials in healthy or decayed teeth is always the same,—quantitatively at least.

B. *Sex.* More frequent in women, in the ratio of three to two.

C. *Constitution.* Weakened by intra-uterine accidents, growth, rickets, acute diseases, hereditary syphilis.

D. *Heredity.* Very important. The teeth of Caucasians are of a quality inferior to those of the Ethiopians. Better teeth are found in the Celtic than in the Cymric race.

2. *Local Predisposing Causes.*

A. *Congenital imperfections of structure.*

(*a*) Superficial. 1. Dark fissures. 2. Depressions in the enamel. 3. Absence of enamel. 4. Supernumerary tubercles.

(*b*) Deep. Interglobular spaces of Czermak. Abnormal distribution of density (Cruet).

B. *Kind and position of teeth affected.*

(*a*) All the teeth in general: Upper more frequently than the lower, in the ratio of three to two, except the lower second molar.

(*b*) In a particular tooth: Unpolished surfaces; interstices; neck.

According to Black, the factor concerned in the production of gelatinous plaques has to be looked for in the buccal fluids. (See "efficient causes.")

3. *Occasional Causes.*

Avenues of entrance for microbes of dental caries:

A. Fissures. Traumatisms.

B. Pathological abrasion.

C. Subluxation. Alveolar resorption (cement exposed to the action of the buccal acids).

D. Gingivo-stomatitis. Exposed necks.

E. Chemical agents. Classification of Magitôt:

(*a*) Those which change uniformly all the dental tissues (acids—lactic, butyric, malic, cider, carbonic acid; sugars through their products of fermentation; albuminoidal substances, through their products of putrefaction (butyric and valeric acids, etc.).

(*b*) Those which disorganize principally the enamel (alum, oxalic acid, and acid oxalates).

(*c*) Those which act specially and exclusively on the dentin and cement (acetic acid, tartaric acid, acid tartrates, tannin).

F. Fermentation acids, under the influence of certain microbes of the mouth: *Mycoderma aceti* (acetic fermentation); *Bacillus acidi lactici* (lactic fermentation); *B. amylobacter* (butyric fermentation); microbes of Vignal—out of nineteen species isolated from the mouth, nine produce lactic fermentation; *B. acidi lactici* of Hueppe (or Miller); *B. butyricus* of Prazmowski; micro-organisms of Williams (DENTAL COSMOS, 1897), which decalcify the enamel.

The causes E and F are occasional ones, for they open the door to the microbes of caries; after that they act in the capacity of adjuvants.

4. *Efficient Causes.*

Microbes spoken of as the microbes of caries, Underwood and Milles, in 1881; microbes of Galippe and Vignal; microbes of Miller—*B. dentalis viridans.*

Black and Williams have observed that these microbes, in order to produce dental caries, protect themselves behind a gelatinous plaque. In the mouths of persons possessing immunity to dental caries these same microbes are found, but there is no development of the gelatinous plaques. "The same acids are formed, but dissolve freely in the saliva" (Black). (See "local predisposing causes"; salivary chemistry.)

Microbes of Choquet (I, II, III, IV, V), isolated from three teeth that had been filled a long time previous to the experiment (fillings intact); three micrococci, two bacilli, facultative anaërobic. No. I dissolves dentin without liquefying the gelatin.

Microbes of Goadby (British Dental Association, February, 1900; see DENTAL COSMOS, March and April, 1900): *B. Necrodentalis, B. furvus,* and *B. plexiformis.*

N. B.—None of the microbic species described up to the present time are of an absolute specificity.

Discussion.

Dr. CHOQUET began by thanking his friend Dr. Frey for the kind allusions that he had made in regard to his latest researches. Dr. Choquet then explained that he wished to speak about certain points that he thought were of great importance. He then said: Some of our confrères, when referring to my work, say that I have found two specific microbes of caries. I have answered them that I am totally convinced that specific microbes of dental caries do not exist, and the reason is because the beginning of dental caries consists in the decalcification of the enamel. We base ourselves on the chemico-parasitic theory, which is the only one that has been proved.

The experiments upon which the theory is based have not been thoroughly conducted, but though they were not absolutely perfect, they have nevertheless all the chances of becoming so.

The first stage of dental caries consists in the decalcification of the enamel. If we take as an example the tooth of a child, once the tooth has been attacked and an opening is established, what takes place? This opening will be in constant contact with the saliva that I consider to be the principal agent concerned in the production of caries. Everything is found in saliva.

I am convinced that the specificity of the microbes of dental caries does not exist, as this disorder can be produced by any of the ordinary mouth micro-organisms.

In the deepest portions of the dentinal tubuli we do not find so many species, or so many varieties and shapes. And I think that it is safe to say that if in the deeper portions of the tubuli we find a smaller number of micro-organisms it is only due to the property of living in the absence of oxygen, a property which those organisms possess.

I am convinced, and probably next year I shall be able to scientifically demonstrate, that dental caries can be produced by any common species of micro-organisms.

Of all the gelatins that I have used, only one became liquefied. This was one whose composition was the nearest to the composition of the dentin. I prepared it in the following way: I took ordinary bouillon without pepton or salt; to this bouillon I added thirty per cent. of filings of hippopotamus teeth. It was then sterilized in the autoclave. It happened that the tubes of ordinary gelatin—that is, of the kind resembling mostly the composition of enamel—did not liquefy, but at the end of nine months, a period corresponding nearly exactly with the one demanded by the experiment in the living animal, this gelatin became liquefied, while the other did not suffer any consequences. Hence in this case there is not only a relation of cause to effect, but an absolute proof that the micro-organisms that I have used are devoid of specificity, and have produced the same results in the tooth-gelatin as in teeth themselves.

I wish to emphasize the following conclusion: That specific micro-organisms of dental caries do not exist.

Dr. LOSADA said that the literature on this subject begins to become voluminous; also that all the writers consider the decalcification of the enamel after it has taken place, while very few explain how this condition begins. He said that he wished that some of the confrères present would tell us how they explain the decalcification of the enamel which takes place notwithstanding the cleansing actions of the tongue and saliva.

Dr. Losada thinks that if the cavity is disinfected the tubuli must also become disinfected.

Dr. CHOQUET answered Dr. Losada's inquiry by saying that the causes described by Dr. Frey are local ones; there is very often an avenue of entrance. If you examine longitudinal sections of teeth absolutely healthy—say, for instance, teeth extracted for regulating purposes—you will find that imperceptible cavities penetrate sometimes as far as the dentin.

It must be observed that yellow teeth decay with greater difficulty than white ones. I have not studied the question of acidity.

The president thanked Dr. Frey for his synoptic table, and called on Dr. LOUP, who read his article (which here follows) entitled

CONSIDERATIONS ON THE RÔLE OF MERCURY IN MERCURIAL STOMATITIS.

In a recent communication to the Société de Médecine Dr. Millée refers to a case of hydrargyrism, and from the discussion which followed we concluded that we were not very well fixed in regard to the etiology and the mode of action of this affection.

It is generally admitted that mercurial treatment has occasionally as a sequel mercurial stomatitis. Do mercury and its compounds play the *rôle* attributed to them? Mercurial stomatitis means a pathological condition of the mouth caused by mercury. The same would be the case if we would say Loeffler's angina instead of diphtheritic angina, on account of the name of the bacillus which produces diphtheria. This causes a modification in the character of the etiology which is of some importance, and which may contribute toward the removal of the hesitancy of a number of specialists in prescribing this valuable agent. A differentiation must be made between the determining and the active causes. Now, the active cause of all stomatitis is the germs which are found in uncleanly mouths, and the clinic has shown us that mercury is of no effect if certain conditions, that we will enumerate later on, exist.

If mercury alone were capable of producing stomatitis it would produce it in all individuals to whom this agent is prescribed, and practice shows us this is not so except in cases of particular idiosyncrasy.

A culture bouillon cannot be ingested with impunity, or a virus inoculated without suffering the typical manifestations. Moreover, a mercurial stomatitis is rapidly cured with irrigations of bichlorid of mercury. Could diphtheria be treated with applications of a bouillon culture of Loeffler's bacillus? If mercury has not a direct (primordial) action, it acts in the following way: It modifies, transforms, prepares the field of invasion, which already is an appropriate one because of the unclean condition of the mouth and the acquired syphilis,—for it must not be forgotten that the patient is generally a syphilitic. We have observed stomatitis before the mercurial treatment began. We certainly do not want to say that syphilis was the only etiological factor, but that it can exist independently of mercurial treatment.

Stomatitis is a parasitic disease of an epidemic form, having no other etiology than the microbic one, and appearing all at once or as the consequence of general or local pathological manifestations. The eruptive fevers, syphilis, changes in the economy, as gestation, the evolution of the third molar, the ingestion of chemical products, such as mercury, lead, copper, bismuth, etc., can be the causal factor in the production of a disease which until then was in the latent state. We know that mercury has been considered to be the cause of this type of stomatitis, because of the metallic taste which the patients under this kind of treatment have; they compare this taste with that of coins. Other patients have the same taste without suffering from stomatitis.

The explanation of this fact is found in the way in which mercury penetrates into the tissues of the mouth. A certain quantity is eliminated by the salivary glands. The question refers not only to the field of absorption, but also to therapeutics in connection with its administration. It is certain that toleration depends on the three principal organs of elimination,—the kidneys, the intestines, the salivary glands. Now, while nephritis is rare, enteritis, and principally the different forms of stomatitis, are very frequent. There is no doubt that the kidneys are the organs through which the greatest quantities of mercury are eliminated; hence it would be natural to suppose the greater mercurial lesions to be located in these organs did we not know that in comparison with the intestines and mouth few or no bacteria are found in the kidneys.

The abnormal salivation produced by mercury seems to demonstrate that either the kidneys do not perform their functions in a regular way, or that the drug is administered in too strong doses. An objection presents itself immediately, as follows: If the stomatitis is not due to mercury, why is it that as soon as the treatment ceases the stomatitis disappears? For two simple reasons: . First, because the causal factor (the irritant) is suppressed, and, second, because the mouth is cared for.

Dr. Jullien says, in connection with Dr. Millée's cases, that the administration of mercury should not begin before the mouth is in a perfect condition. Dr. Buret has affirmed what we repeat daily in our clinical lectures,—no stomatitis will take place in a healthy mouth, in one which is attentively examined during the specific treatment, because mercury is a powerful agent which puts the cells with which it comes in contact in a condition of diminished resistance. With regard to the contagiousness of mercurial stomatitis, we do not believe with some of our confrères. We certainly do not deny that if two indivduals sleep in the same bed and one uses mercurial ointment the other is able to absorb the mercury in one way or another, either through the skin or through the respiratory mucous membranes; but this seldom happens. Besides that, it has not been proved that mercury is found in the individuals under observation. Just as Loeffler's bacillus is observed in the products of contagion, in the same way mercury should be found if this is the agent concerned in the causation of the disease under discussion.

The so-called mercurial stomatitis is the same as all other forms of stomatitis; of that observed in pregnant women; of that caused by the evolution of the third molar, etc. It is the same disease which starts under the influence of different agents, but whose original cause is the same,—the microbic flora which live in the mouth as in a medium expressly prepared for them. Mercurial stomatitis is a contagious disease, and an example of this condition is to be found in the spreading of this disease among soldiers. One soldier who was suffering from stomatitis, caused by the vicious evolution of the third molar, transmitted this trouble to all the men occupying the same room. Strange to say, all suffered from a defective evolution of the third molar, just as though they had swallowed the pneumococci.

Going back to the case of Dr. Millée, it seems to us that we do not need to go very far in order to look for the relation between the two stomatites. If mercury is responsible for the production of the disease in the first individual, it is of no significance in the second. Microbes are active whenever the conditions are appropriate, and, we repeat, it is a simple case of contagion, no matter what the adjuvant cause was.

Just in the same way that certain cases of syphilis are of a malignant type, certain cases of stomatitis are of a marked tenacity and extreme virulence. Contagion from individual to individual follows in this case the ordinary laws of similar cases. The most appropriate tissues, either through general debility or on account of buccal uncleanliness, will be the first to be attacked. In consequence it is not extraordinary that the woman who partakes of her husband's bed should contract the stomatitis which her husband is suffering from.

We will conclude by saying that mercurial administration should be preceded by treatment of the mouth. One or two sittings should be sufficient for the preparation of the mouth. It is absolutely necessary that salivary calculi should not be left at the necks of teeth, as they provoke small ulcerations, which give access to the microbes of the mouth. No débris should be left in teeth suffering from advanced caries. The scalings and antiseptic irrigations should be made during the two sittings. After that the specific treatment can be started, conjointly with the careful treatment of the mouth conditions. All cavities of decay should be treated and filled; all the roots treated, filled, or extracted, in order to eliminate any possible focus of microbes. All rough edges should be polished. Besides this, the patient will pursue the following treatment:

1. Brush the teeth twice a day with a hard brush, using the following preparation:

Pulverized carbonate of calcium, 20 gm.;
Salol, 2 gm.;
Calcined magnesia, 6 gm.;
Potassium chlorate, 2 gm.;
Menthol, 10 drops.

2. The following mouth-wash to be used morning and evening:

Sozoiodol of zinc, 25 gm.;
Distilled water, 250 gm.
One dessertspoonful in half a liter of boiled water.

3. Chlorate of potassium, 4 gm.;
Mucilaginous liquor, 125 gm.
A dessertspoonful before retiring during three or four days after the administration of mercury.

The proportion will change according to the conditions of the mouth. The precautions should be doubled during menstruation.

We also recommend washing the mouth after each meal with Vichy water.

We will confess that these are exaggerated precautions, but we must not forget that stomatitic patients are either anemic or unclean persons, and the mouth has to be constantly under attentive care.

We can continue to administer mercury. Nevertheless, we must not forget that it is a poison, and that serious accidents may follow its administration,—sometimes even fatal ones. These are exceedingly rare cases. We must not forget that a thousand accidents may cause death, syphilis among them.

Discussion.

Dr. NUX. Dr. Loup has spoken about the contagiousness of ulcerative stomatitis in the case of soldiers. It has been observed that this disorder is very frequent among soldiers because of their bad and unhygienic conditions; also because their teeth are not cared for.

He also spoke to us about the contagiousness of mercurial stomatitis. I think that the contagion took place because the person had both ulcerative and mercurial stomatitis. This is what happens in the majority of cases. In every case mercurial stomatitis does not present all the disorders observed up to date. I agree with Dr. Loup.

Dr. Chompret. Dr. Loup has told us that he has seen cases of mercurial stomatitis in syphilitics even before the administration of mercury. I do not know if he has seen many cases. Six or seven years ago, when I wrote my thesis on this subject, I looked for everything that had been published, and I did not find a single case. Since then I have found one, which I presented to the Société de Syphilographie, for I thought that it was the only case on record.

With regard to mercurial stomatitis, every one present knows that it is cured by increasing the dose of mercury. I think that in the majority of cases the condition is rather one of ordinary gingivitis.

Dr. Loup. I think that we are practically of the same opinion; that is, that in reality mercury is not the cause of stomatitis.

I ignored completely the work of our confrère because the little work that I submit to-day to your consideration is simply an answer to an article presented to the Société de Médecine. I have not made a study, nor have I made any researches. I have simply published the result of the studies made in our clinical service; also during four years of residence in Saint-Lazare Hospital, where I saw many syphilitics.

I saw cases of mercurial stomatitis, but not in excess of other types of this disease. It is the same disease under different forms. It is not necessary to be a syphilitic in order to suffer from stomatitis.

Dr. Frey congratulated Dr. Loup upon his communication; also for partaking of Galippe and Morel's opinions.

Dr. Roy said that he was very much pleased with Dr. Frey's observation, as he intended to recall Galippe's very interesting labors on this subject. He then said: I believe that he was a little too exact to affirm that mercurial stomatitis does not exist. Yes, it does exist; but if mercury is not administered, mercurial stomatitis is not produced. Galippe went so far as to treat mercurial stomatitis with mercury.

Discussion closed.

Mr. T. E. Constant, of Scarborough, England, then read his paper entitled "The Eruption of the Teeth."*

The president thanked Mr. Constant for his very interesting paper.

Meeting adjourned at 6.30 p.m.

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*An abstract of this paper is given at page 1281 of this issue.

SECTION III.—OPERATIVE DENTISTRY; SPECIAL THERAPEUTICS.

SECTION IV.—GENERAL AND LOCAL ANESTHESIA.

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

[JOINT SESSION.]

The president called the meeting to order at 4.10 P.M.

The first paper on the program was an article on "Pyorrhea Alveolaris," by Dr. W. J. YOUNGER, of San Francisco, but, as he was not present, this article was not read.

The president then called on Mr. G. BRUNTON, of Leeds, England, to read his paper on "The Surgical Treatment of Roots by Means of Sponge-Grafting."*

Discussion.

Dr. HEDDY. This method is used in connection with roots absorbed through operation or some other reason. Mr. Brunton's system consists in the placing of a sterilized sponge. He opens the canal and places a piece of sterilized sponge. Some of his operations are seven and eight years old, and the patients have been examined twice a year and no sign of inflammation has been found. This kind of operation has been very successful.

Dr. DUCOURNAU inquired if the sponge was left there forever.

Dr. HEDDY. Yes; always.

The president then called on Dr. N. S. JENKINS, of Dresden, Germany, to read his paper on "Porcelain Enamel Inlays."†

Discussion.

Dr. HESSE believes that Dr. Jenkins's essential merit consists in the fact of his having invented a durable porcelain of adequate color. Dr. Hesse also said that, although Dr. Jenkins's method was worthy of being used, his opinion with regard to considering it a crime to fill cavities with gold should not be accepted. He also said that the method of filling with porcelain was not an easy one.

Dr. CHENET referred to a visit that he had paid to Dr. Jenkins. He said that he had been greatly surprised by the magnificent operations of Dr. Jenkins. When he (Dr. Chenet) returned to Sweden he undertook the study of this method. At first he was not successful, but to-day he feels very enthusiastic about this method. He then spoke about the difficulty of getting the right colors, and concluded his remarks by recommending Dr. Jenkins's method.

Dr. GROSS said that he had been practicing with inlays for two years, and wished to make a few remarks with regard to some practical points. He spoke about the absolute necessity of having cavities in accessible and visible places, and added that for those teeth in which, with the ordinary methods known, a good ordinary filling was not possible, a porcelain one should not be attempted.

He then said: Dr. Jenkins and myself use platinum matrices.

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*Printed in full at page 1274 of this issue.

†Printed in full in November issue, page 1109.

This is a very advantageous material; it is also very convenient, in the sense that no investment is necessary.

I found a slight modification of this method in an American publication. This modification consists in taking two impressions of the cavity. This precaution permits the making of a perfect inlay. The system of taking a single impression gives sometimes poor results, on account of the contraction of the porcelain. It is true that more porcelain is added, but if at the last melting in the matrix a slight movement occurs the inlay becomes defective.

When using the double impression system the inlay is first slightly baked; the margins are then cleaned, and the matrix is again burnished against the cavity. In this way at the last baking a perfect inlay is produced.

I have not a very long experience in this line of work, nevertheless I can speak of the results obtained, for I have made a certain number of inlays.

Shall this method be employed in every case? I think not. There are cases where porcelain gives good results, but in others it is better not to use this material. The cavities must be readily accessible, for if you have to deal with a cavity from which the impression cannot be removed without changing its form the inlay will be defective. In the case of approximal cavities the necessary space must be obtained. Porcelain should not be used on masticating surfaces. In such cavities gold fillings give better results. Porcelain inlays should be reserved for the anterior teeth and for selected cases. In other places the inlay is exposed to an enormous amount of stress, and may leave the cavity. I think that in many cases we have to insert gold fillings; principally in those places in which a broad masticating surface is required.

Dr. Indjeyan. We thank the gentlemen for everything that they have said, although I believe that what they said are facts known to every one present. I had the opportunity to see Dr. Jenkins in the Société de Stomatologie. Dr. Jenkins uses very thin gold instead of platinum, and he does not need to heat it to a very high temperature. This is why he does not use platinum.

Dr. Pont. You can find platinum as thin as gold.

Dr. Indjeyan. But, as he does not need a very high temperature, he uses gold.

Dr. Ducournau. I have not tried porcelain fillings, but my associate has. He has made many inlay operations, even too many, for a number of them were failures. Porcelain fillings in masticating surfaces do not offer enough resistance. They become disorganized after a certain time. I would not use porcelain fillings in masticating surfaces. For labial and approximal cavities the porcelain inlays are very acceptable.

Dr. Marion said that the composition of enamels and porcelain bodies should be made known. The dentists knowing chemistry can judge as to the compositions which deserve the preference. He concluded by making the request that the precise formulæ of all of this class of compositions should be made public.

The President asked that the discussion be closed, on account of the other numbers on the program. He then made a *résumé* of the discussion, and said: It is absolutely indispensable that we should know the composition of the materials used. Dr. Marion is perfectly right, and, as a member of a scientific assembly, he has the right to ask for clear and precise formulæ.

The next number on the program was a paper by Mr. G. CUNNINGHAM, of Cambridge, England, on "Immediate Prosthesis."*

The next paper was by Dr. A. PONT, as follows:

CATAPHORESIS IN DENTISTRY, WITH SPECIAL REFERENCE TO HYPERSENSITIVE DENTIN.

Cataphoresis consists in the introduction of drugs into the system by means of a galvanic current.

The words cataphoresis and anaphoresis are improper terms, and should be substituted by electrophoresis, which has the advantage of suggesting the word electrolysis, with which it has a great analogy.

The services rendered by cataphoresis can be divided into three groups. Cataphoresis is very useful in connection with caries of the second degree with hypersensitive dentin. It is also useful in caries of the third and fourth degrees, although in such cases it can be advantageously replaced by other methods.

The use of cataphoresis as a medium for inducing anesthesia for extractions should be abandoned.

Cataphoresis, in the proper sense of the word, means the transmission of liquids or solids from the positive to the negative pole. This phenomenon was discovered by Davy, who saw particles of carbon passing from the positive to the negative pole of a voltaic arc.

Another classic experiment is the one by Porret. This experiment demonstrates that if a vessel divided in two compartments by means of an animal membrane is filled with water, the level of the water in the compartment in connection with the positive pole descends, while the contrary takes place in the compartment in connection with the negative pole.

The same phenomenon occurred in Wittich's experiment when using a solution of albumin at the negative pole and water at the positive pole; this in spite of the non-diffusibility of albumin.

Fusinieri observed, in a very well-known experiment, the double transportation of copper and silver through a bar of copper and a ball of silver.

These are a few examples of the action which, since the time of Porret, has been called the action of the cataphoric current, which is, as we shall see, very different from electrolytic action.

Faraday says that all compounds under the influence of the current yield products of decomposition called ions. Those which appear at the positive pole (anode) are the anions; those which appear at the negative (cathode) are the cathions.

If the positive and negative poles of a battery are immersed in a reservoir of copper sulfate it will be observed that the sulfuric acid is found at the positive pole and the copper at the negative. This phenomenon is known under the name of electrolysis.

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*Dr. Cunningham's paper was not received in the report furnished to the DENTAL COSMOS.—ED.

The anions run from the negative to the positive pole, and are electro-negatives. The cathions, on the contrary, run from the positive to the negative pole, and are electro-positives.

Cocain, morphin, strychnin, all the alkaloids, and all the metals are cathions; hence they must be placed at the positive pole if they are to be introduced into the tissues. Iodin, oxygen, chlorin, chromium, all the metalloids, and all the acids are anions, and should be applied to the negative pole.

In medicine and dentistry elementary substances are seldom used. Medicaments are generally compound bodies, generally salts,—cocain hydrochlorid, potassium iodid, etc.

The electrolytic action of the current precedes the cataphoric action; the salt is decomposed into anions and cathions, and then the cataphoric action begins. Herdmann makes exception of certain substances whose molecules are carried by the current without undergoing electrolytic action. The molecules of these substances act like true elementary bodies, but, with this exception, all compounds, specially all the drugs used in connection with cataphoresis, are decomposed into ions before they are transported by the current.

We do not agree with Herdmann with regard to his statement concerning the intact transportation of certain medicaments when using a weak current.

There is nothing precise known about the strength that the current should have, and it is only through experimentation that the strength of current necessary to cause the penetration into the tissues of a substance without causing the disorganization of its molecule or after they have been converted into ions can be ascertained.

The so-called cataphoresis, the medicinal cataphoresis, would only be, as Dr. Price says, pure and simple electrolysis if the cellular layers of living tissue could be considered as inert membranes. But we must not forget that the action takes place in a living organism, and that a reunion of physical phenomena (electrolysis) and physiological phenomena of cellular reaction (catalysis) takes place.

It is the group of these phenomena that constitutes what is known under the name of cataphoresis, and that we will call electrophoresis, so as not to confound it with the same phenomenon of Porret.

What is catalysis? Remak gave this name to a group of physical and physiological phenomena.

The physiological phenomena are:

First. Modification of the skin.

Second. Vaso-dilatation.

Third. Increase in osmosis and in the absorbent power of tissues.

Fourth. Modification of the molecular exchange and of nutrition.

From the foregoing we are able to explain the following facts:

1. That the drugs introduced into the skin by means of the galvanic current are gradually eliminated, and more slowly than those introduced by hypodermic means.

2. The drugs do not penetrate deeply into the tissues, and do not go through a fold of skin.

The first fact is easily proved by means of a hypodermic injection of five milligrams of lithium chlorid. An hour after the injection the compound appears in the urine, and completely disappears after two hours. Now, the same compound introduced by means of cataphoresis appears only after twenty-four hours, and takes four days before it is completely eliminated (Savy's thesis, Lyons, 1895).

The second fact was clearly demonstrated by Dr. Aubert in 1892 (*Lyon médical*).

The writer quotes the experiments of Dr. Aubert, and concludes by saying that the substances introduced by means of cataphoresis do not penetrate even 1 or 1.50 centimeter.

The instruments necessary for the application of cataphoresis are an electric current of fifteen to sixty volts, a rheostat, a milliampèremeter, and positive and negative electrodes.

Source of the Current.—In order that a galvanic current may be utilized, it must be regular and of a weak tension. The street current can be used not only to run the motor, but also for lighting purposes, cataphoresis, and galvano-cautery. The current must be a continuous one.

If the street current fluctuates very much, its direct application to cataphoresis would not be possible. In such a case the addition to our outfit of an accumulator of high tension permits of the use of all the advantages of a continuous current. It is due to this apparatus that we are able to isolate the cataphoric appliance from the street current.

In places where street currents do not exist batteries and accumulators will answer the purpose.

Rheostat.—It is specially in dentistry that the current must be carefully graduated, on account of the extreme sensitiveness of the dental tissues.

The method ordinarily employed in electrotherapy, and which consists in gradually increasing the number of elements, so as to obtain the desired intensity of the current, cannot be used in dentistry, because if the tension be increased even at the minimum rate of adding one cell at a time it would cause violent jerks. Besides, in this method new conductors are introduced in the circuit, and these can become charged and may discharge their energy on the patient. Even the volt-selectors employed for cataphoresis, and specially the wire rheostats having a great number of circumvolutions, are not useful.

The examination of all these different cases induced me to construct my new regulator of precision of the current and differential volt-selector, which answers in perfection for all the purposes and conditions needed in order to obtain good results.

Milliampèremeter.—The milliampèremeter used for cataphoresis does not possess any particular features. This instrument is absolutely necessary. We cannot judge the intensity of the current from any subjective or physical symptom. In every case the intensity varies, and it is necessary to have a milliampèremeter in order to note these changes.

Electrodes.—The electrodes and the rheophores should be connected with the battery only when in use.

The positive electrodes are applied in the cavity or in the gingivodental region, and the negative electrodes can be applied against the cheek or hand of the patient. The positive electrodes become negative when electro-negative elements (anions), such as iodin, oxygen, are used. In this connection I think that it would be more appropriate to say active and indifferent instead of positive and negative electrodes. Many electrodes have been invented and described; the least complicated are the best.

Positive or Active Electrodes.—The simplest and mostly used is the one with the platinum ball at the extremity. This has to be held by the operator, and we will say in passing that in no case should the patient do it. An electrode that does not need to be held by the operator is the one to be preferred. First, because the slightest displacement of the point causes painful jerks; second, because it is hard to keep up the same pressure, and because if the case is the reverse there are risks of changing the intensity of the current; third, because of an economy of time and work.

Negative or Indifferent Electrodes.—The question of where to place the negative electrode, in the hand or cheek, has been largely discussed. It has been said that when applied against the cheek the resistance is diminished, that the results are more rapid, and that the operation is not under the control of the patient.

The writer is in favor of holding the negative electrode with the hand, although he points out the impossibility of so doing in the case of children or timid women. In such cases it is better to apply the electrode to the cheek, and to use the Klingelfuss forceps, which has a large metallic plate for the interior of the mouth and a rubber isolator for the exterior. In order to avoid accidents and to diminish resistance a piece of cloth saturated in salt solution should be applied between the mucous membrane and the metallic plate.

Operative Procedure.—It is necessary to take certain precautions before the current is applied to the tooth. The operator will assure himself that his apparatus is in good order, paying special attention to his rheostat and milliampèremeter. He will then examine the electrodes. After this is done he will prepare his solution, and will remove from the cavity of decay the particles of loose and soft dentin present, and will then apply the rubber dam. This last precaution is absolutely necessary, for electrophoresis cannot take place in the presence of saliva; for if the solution comes in contact with the saliva it runs the risk of becoming decomposed, or at least diluted. The electrolytic decomposition can undergo marked changes, and at last, as the tooth has less conducting power than saliva, the current would become deviated and would not pass through the tooth. This we believe is one of the principal causes of failure. It is because of not having taken this precaution that operators reject electrophoresis. After all these precautions have been taken the field of operation is washed with sterilized water. The next step consists in placing in the cavity a ball of cotton saturated in the solution to be used. The indifferent electrode is placed against the cheek or hand of the patient. The passing of the current should not be the cause of painful sensation. The active electrode is placed in the cavity, and is held in position by means of gutta-percha.

After the electrodes are in their right place the handle of the rheostat is slowly turned, starting at o. The milliampèremeter must be constantly watched, and the work must stop as soon as the intensity required has been reached. It is not necessary that the patient should feel the current; on the contrary, the current must be stopped as soon as the patient perceives it, and the intensity should not be increased until the patient ceases to feel the painful sensation alluded to.

The duration of the application varies according to the character of the operation. To anesthetize the dentin four or five minutes are required; for the extirpation of a pulp seven or eight; for the treatment of infected teeth nine to ten, and ten to fifteen for bleaching operations. After this time, which should not be decreased, specially in cases of sensitive caries of the second degree, the handle of the rheostat is slowly returned to o. The current must be gradually reduced, and the electrodes should not be removed before the needle is at o, otherwise an interruption of the current, which provokes a disagreeable and painful sensation, is produced. It is also for the same reason that the electrode must be applied to the cavity and maintained there with uniform pressure and perfectly immovable. The operation should assure himself that during the application no loss of current takes place through the clamp which retains the rubber dam, or through a neighboring filling. When it is impossible to prevent the contact of the electrode with a metallic filling or a clamp a lining of chloro-percha should be made between the parts to be isolated. This precaution is not necessary when the positive electrode used has a covering of rubber.

In certain cases it is necessary to change the solution. In such case the operation has to be performed in two stages, or a few drops can be applied every little while on the extremity of the electrode.

The operative procedure is based on two points:

First. On preventing the loss of current in order to have a positive result, and also to avoid accidents.

Second. Avoid strong increase or decrease of the current, so as not to cause suffering to the patient.

The writer then speaks about the causes and symptoms of pathological sensibility of the dentin. He quotes a few authors, and concludes by saying that he partakes of Tomes's and Johnson's views with regard to the nervous character of the odontoblasts.

The *modus operandi* of electrophoresis for the suppression of pain due to hypersensitive dentin is similar to the method of procedure that we have already described.

Certain authors recommend to make an application of salt solution to the cavity before the drug is applied. The salt solution is supposed to lessen the resistance. We believe that this precaution is not necessary. Dr. Price, of Cleveland, Ohio, who experimented in this direction, found that the average resistance through the patient for about twenty-five cases was about 25,000 ohms, varying all the way from 10,000 to 78,000 ohms, and in some cases even higher. The difference of resistance from the hand to the tooth and the cheek to the tooth is from 3000 to 5000 ohms.

The condition of the cavity can produce marked changes in the amount of resistance. Price found that in a given case the resistance through the patient from the cavity, which was barely moist, was 46 ohms. The introduction into the cavity of a forty per cent. solution of cocain in water reduced the total resistance to 25,500 ohms, and to 23,800 ohms when the negative electrode was placed on the cheek instead of in the hand.

The greater part of the resistance of the patient is in the tooth, this resistance varying all the way from 1000 ohms to 70,000. It is the dentin which offers the greatest resistance, and this resistance is in direct relation to the dryness and thickness of the dentin.

The resistance of extracted human teeth is greater than that of living teeth.

The author says that the best drug to be used in connection with electrophoresis is cocain, the results being the same with ten, twenty, thirty, and one hundred per cent. solutions. The strength of the current should be from three- to four-tenths of one milliampère, even if the patient has not felt any sensation. The current is passed for a few minutes, and the rheostat is gradually brought back to 0.

The writer emphasizes the fact that sudden variations in the current are the cause of painful sensations.

For large cavities it is sometimes necessary to add a little cocain during the operation. In such a case the needle is brought back to 0; after two minutes a drop of cocain is then applied to the electrode, and the application is continued for two more minutes. It is also necessary that the cotton should fill the cavity, otherwise it could happen that some points in the dentin would not become anesthetized.

Causes of Failure.—Accidents.—The first precaution to be taken when using electrophoresis is to see that the current is not inverted. To ascertain this we take a cotton pledget saturated in a solution of potassium iodid. The salt decomposes when the negative pole is applied to it, and the iodin liberated stains the cotton.

The operator must also assure himself that no current escapes, and that it passes through the tooth. Care must be exercised in order that the electrode should not come in direct or indirect contact with the soft tissues, for if this takes place the cheek or gums may become lacerated. Nevertheless, we will say that with the intensity and the length of time that we use for our operations this accident must be an exceptional one.

The writer quoted an accident of this kind happening in the practice of Dr. Heise. This practitioner had not noticed that the negative electrode was in contact with the clamp, and the result was a burn in the skin of the cheek.

The best results are obtained in teeth of young patients. Dr. Gillett, of Newport (DENTAL COSMOS, August, 1897), says that in certain cases it is impossible to obtain satisfactory results in teeth of old patients.

The writer stated that sometimes pericementitis is the sequel of electrophoresis, and describes two cases of this kind, one in his own practice, and the other in that of Dr. Gillett.

Cerebral and visual troubles have also followed the cataphoric use of cocain. Two cases of poisoning are also on record; one in the practice of Dr. Moore, of Frankfurt, the other in that of Dr. M. W. Foster, of Baltimore (DENTAL COSMOS, 1898).

Dr. Pont does not believe that poisoning or visual and cerebral troubles follow the use of electrophoresis. He argues from the small amount of cocain used, and says that, although certain persons are very susceptible to cocain there is no danger, for the power of penetration is very slow and the elimination is gradual.

Conclusions.

1. Cataphoresis, which should be called electrophoresis, consists in introducing drugs into the organism by means of the continuous current. The penetration, even in the dental tissues, is very slight.

2. The drugs used are generally compound bodies. They always undergo the electrolytic action of the current, and are decomposed into anions and cathions before they are forced into the living cells.

3. Metalloids and acids are anions. They go from the negative to the positive pole, and are in consequence electro-negatives. Metals and alkaloids are cathions. They go from the positive to the negative pole; they are electro-positives.

4. The operative procedure of cataphoresis in dentistry is very simple. The current should be increased progressively, and sudden interruptions should be avoided. Saliva must be excluded, and care should be exercised in order to see that the current is passing through the tooth.

5. Cocain cataphoresis is very useful in cases of hypersensitiveness of the dentin. The cavity can be excavated and prepared without causing any suffering to the patient.

With this method the pulp can be extirpated in one sitting.

6. Iodin cataphoresis is very serviceable in the treatment of caries of the fourth degree, with or without complications; also for treatment of root-cysts.

7. The pigmentation or abnormal coloration of devitalized teeth is rapidly bleached with hydrogen peroxid and cataphoresis.

8. The average strength of the current necessary to anesthetize dentin and to extirpate pulps is of two- to four-tenths of a milliampère. It is useless to apply the current longer than from six to eight minutes.

In other cases currents above one or two milliampères should not be used, and the maximum duration of the application must be from ten to thirteen minutes.

No discussion followed the reading of this paper.

The president then called on Dr. RICHARD-CHAUVIN, of Paris, to read his paper entitled

A NEW SYSTEM OF REMOVABLE BRIDGE-WORK.

After discussing the marked disadvantages of fixed bridges, the author concluded his preliminary observations by recommending the use of removable fixtures if their application could become as generalized and possible as that of fixed pieces.

The parallelistic appliance that he uses for the construction of his system of bridges is the same that he submitted twelve years ago to the Odontological Society of Paris. He believes that it is the simplest and most practical one.

This appliance is composed of (1) a triangular tube and a bar, also triangular. The tube and bar are drawn together through the draw-plate, so that no space shall exist between the two bodies. (2) Two little hollow steel tubes of two millimeters in diameter and five in length, which are soldered to the vertex of the triangular tube and bar. (3) Cylindrical bars of varied lengths and diameters. Their inferior extremity is of a diameter equal to the anterior diameter of the tubes. These cylindrical bars are made of steel, and have a thread cut into them so as to permit of their adaptation to cylindrical tubes. The bars represent the different diameters of the pins that it is desirable to use. These bars are interchangeable, and when adapted to the cylinders complete the parallelistic appliance. (4) It also embraces a screw which is used to lock the appliance after the parallelism is obtained.

The working of this appliance is as follows: The bar slides into the tube, and the distance between the cylindrical bars, which represent the pivots, is regulated. The object of this appliance is to obtain a parallel relation between the teeth intended to support the bridge.

We may classify removable bridges in three principal groups:

1. Appliances supported by several crowned roots into which parallel tubes are fixed.
2. Pieces supported by both roots and teeth.
3. Pieces supported only by teeth.

Appliances of the First Group.—Those Supported by Roots Alone.

A. *Crowning of Roots.*—We believe that roots should always be crowned. The preparation of the roots is mechanically attained by means of suitable instruments. In order to conceal the gold the root should be trimmed and the band extend two or three millimeters under the gum externally; the floor of the band is formed by two plates soldered at an obtuse angle.

By means of this method of procedure the gold is concealed under the gum, and only the tooth is visible.

B. *Parallel Preparation of Roots.*—Although with our appliance we obtain a parallel relation between the roots to be crowned, we must not forget nevertheless that certain precautions are necessary to be taken when roots of different axes are prepared, for in some cases if parallelism is to be obtained it will be at the expense of a perforated root and alveolus.

c. *Placing of the Parallel Tubes; their Adaptation to the Crowns.*—After the roots are properly prepared, the next step consists in soldering the tubes to the caps. These tubes should be closed at one extremity by means of little pieces of metal soldered to them. The caps will then be perforated. It is now that the use of the parallelistic appliance will be demonstrated. After seeing that the tube and triangular bar are of the same diameter as the pivots, the appliance is regulated in such a way that the two bars penetrate into the tubes. The tubes are secured to the caps by means of hard wax. The appliance is then removed, and the whole soldered after investing in plaster. As a precautionary measure one cap can be soldered first, and after being assured that the parallelism has not been destroyed the second one is then soldered. By this method as many tubes as the case requires can be obtained.

Taking the Impression.—The impression must be taken with plaster. The real pivots, or pivots made of copper of the same diameter, are placed in the tubes. The pivots must be at least five millimeters longer than the tubes, and must project from them. They must fit accurately. If the operation has been carried out correctly they will come out in the impression, and when the model is poured a correct facsimile of the mouth is obtained.

Second Group.—Pieces Supported by Roots and Teeth.

With this group many combinations can be made. This kind of removable bridges can be supported by one or several roots, and by one or several healthy or decayed teeth. This will be determined by the number and position of the abutments, by the weight and configuration of the appliance.

The roots will be prepared just as for an appliance of the first group. The healthy teeth will be surrounded by a collar, or will be crowned. We prefer the clasps with spurs attached to them.

Bridges can be supported by decayed teeth, according to the size of the teeth and the extent of the decay. Tubes alone or soldered to caps can be supported by such teeth.

Abutments.—It will be a difficult matter to prepare them if the teeth are suffering from caries of the third or fourth degree, or even of the second.

Abutments in Teeth with Caries of the Third and Fourth Degrees.—The abutments will be made by means of two metallic plates united by a bar. The external one will be made to adapt itself to the lateral portion of the tooth, inclosing the contours of the decay; the other will inclose the prepared cavity. The external plate is thin (No. 6) so as to be possible to adapt it accurately; the second thicker (No. 12) in order to offer enough resistance.

Abutments in Teeth with Caries of the Second Degree.—In order that these teeth may be serviceable, the cavity must be on the masticating surface, and must be prepared with a flat bottom, and must have one-half millimeter in depth. The extent of the cavity should be as great as the mesio-distal dimension will permit. The support will be formed by a piece the shape of an L, one arm being supported in the bottom of the cavity, the other on the external surface of the tooth where the tube has to be supported.

The support should be sealed with cement, which should be covered and protected with metallic extensions.

When the tube has been cemented in the root, the next step consists in supplying tubes to all the other abutments required (generally three). Whatever be the kind of support used, it must be always against a vertical plane occupying a portion of the lateral surface of the tooth that the tube is to be soldered. Its position in regard to this plate will be regulated and ascertained by the parallelistic appliance. The tube can be in contact with the plate all along its length, or at one point above or below.

The adjustment of the tube to the plate is done by means of the parallelistic appliance, which is regulated to the convenient distance. One of the measuring projections of this appliance is introduced into the tube cemented into the root. The other projection bearing the tube to be soldered is brought into contact with the plate, and is adjusted to it by means of hard wax.

The supports are then removed, invested in plaster, and soldered. During the soldering operation care is to be taken to reinforce the tube by means of solder.

For the direct fixation of tubes only, teeth attacked with caries of the third and fourth degrees can be used in preference to the single-rooted teeth, because longer tubes can be inserted. Nevertheless, the molars can be also used. In such a case the crown and the pulp-chamber should be used, and a filled root-canal will not need to be reopened. A cavity deep and large enough is to be prepared for the reception of the bar which is to connect the pivot to the appliance. This bar, when in position, must not depress the height of the walls of the cavity. It will be entirely inclosed in the tooth in such a way that the entrance of the tube should be placed at a distance of the external contour equivalent to that of the thickness of the bar. But whatever be the retention used, the bar which connects the pivot to the appliance must be placed in the tooth in the manner here described. The tube must be sealed to the bottom of the cavity by means of cement, and the filling can be finished with amalgam or gold. The metallic substance used should protect the cement against dissolution and dentin against caries. Once that the mouth is prepared as described, the next step consists in taking the impression just as for cases of the second group.

Third Group.—Appliances Supported Only by Teeth.

This group comprises all the combinations spoken of as belonging to the second group, excepting supports on roots. Fixtures supported on decayed teeth or by tubes placed directly in the teeth.

After presenting a few practical observations, the author concluded by saying that the parallelistic appliance offers the following advantages:

Its simplicity makes it applicable to general use, and its duration is probably unlimited.

It can be used in all kinds of removable bridge-work operations on account of its precise construction.

As all the pieces are interchangeable, if any accident happens to the appliance the only thing necessary is to replace the broken one.

The system of bridge-work now submitted for consideration has become a possible manipulation, thanks to the parallelistic appliance described, and is an entirely original one.

The rational classification of the different combinations in connection with which the appliance can be applied permits its being used in nearly every case in which fixed bridges are used.

The advantages of the method of removable bridges are very many:

The removable bridge secures the immobility of several teeth and roots whose axes are on different planes.

Hygienic attention is more easily rendered.

The appliance can be easily repaired.

The Section adjourned at 6 P.M.

SECTION VI.—DENTAL EDUCATION.

The meeting was called to order at 4 P.M. by President Franck.

The president then called on Dr. LLOYD WILLIAMS to read his article entitled "The Teaching of Dental Mechanics in Dental Schools."*

(To be continued.)

ANNUAL CONVENTION OF THE SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE Seventh and Eighth District Dental Societies of the State of New York met in annual convention in Buffalo, October 29 to November 1, 1900; Dr. J. Wright Beach, president of the Eighth District Society, presiding.

FIRST DAY.

The *morning session* was given up to routine business.

The *afternoon session* was called to order to 2.30 P.M., and a paper entitled "Dentifrices" was read by Dr. C. C. BACHMAN, Waterloo, N. Y.

The author stated that while the secretions of the mouth are normally alkaline, their actual condition is usually found to be acid and septic. He holds that a dentifrice should combine abrasive material with some mild antiseptic, which should be distinctly alkaline. He objects to tooth-powder, as it is liable to be too abrasive and may injure the enamel; and to washes because they do not mechanically cleanse the teeth. His preference is for a dentifrice in the form of a paste, for the reason that it can be alkaline and antiseptic, and possesses the abrasive power necessary. A small amount of soap should be one of the ingredients, and magnesium carbonate is suggested to furnish the required alkalinity. A paste made after these suggestions and pleasantly flavored would destroy germs in the mouth, correct existing acidity, and cleanse the teeth from food deposits, thus combating the attacks of caries.

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*Printed in full at page 1275 of this issue.

Discussion.

Dr. W. A. Barrows, Buffalo, said that dentists pay too little attention to the necessity of advising their patients as to the dentifrices they should use. The dentist should recommend the use of a suitable dentifrice, and not let the patient be guided by chance to select one that may possibly injure rather than preserve the teeth. It is not enough that patients come to the dentist for an annual house-cleaning and do nothing between times to keep the teeth clean.

He objected to the use of any preparations strongly alkaline or acid, as either would be liable to injure the teeth or the gums. The liquid of sozodont, for instance, is far too alkaline for general use, and would in time destroy the enamel of the teeth and make them yellow. It is the duty of the dentist to know what his patients use, and recommend that which will suit each condition as it exists, and direct when and how it should be applied.

L. C. Jones, Wolcott, said dentists were often asked to recommend dentifrices, and should be so acquainted with the conditions of the mouth and the qualities of such tooth-powders, mouth-washes, etc., that they can make their recommendation intelligently. In mouths where an acid condition prevails he usually recommends milk of magnesia. If the mouth is not acid he prescribes any simple powder.

Dr. A. Osgood, Bath, said that thirty years ago there were comparatively few dentifrices in the market, and, as he wanted his patients to have a safe one to use, he compounded a tooth-powder to meet the ordinary conditions. He did not expect it to destroy germs; it would not remain in the mouth long enough, but it would assist the brush in keeping the teeth clean and free from deposits. The main constituents of the powder are chalk, sugar, cuttlefish bone, and bicarbonate of soda, the latter two in comparatively small quantities. There is nothing in it which will hurt the teeth, and, what is a very important feature in any dentifrice, it is pleasant to use. It is not true of any dentifrice, however, that its use will render the services of the dentist entirely unnecessary.

Dr. G. V. Black, Chicago, favored the use of tooth-powder as a dentifrice, but looked upon all dentifrices simply as cleansers, and not as medicines. He doubted the wisdom of making them either acid or alkaline. Acidity of the mouth is produced by micro-organisms, and can be removed by the use of water. The saliva is generally acid except at certain times of the day. The chief advantage of a dentifrice is that it induces the people to use the tooth-brush more frequently than it would be used without the dentifrice.

It is more important to get the patients to thoroughly chew their food and cleanse their teeth in this way than to use the dentifrice. If every person could be put through a course of training in the thorough mastication of food there would be less necessity for dentifrices. When a patient comes to him and by trial is found to be able to exert not more than about sixty pounds of force on his molars, he knows that this patient does not properly chew his food. Any person who cannot take and chew comfortably an ordinary piece of beefsteak needs a course of training. At the same time the tooth-brush and powder should not be neglected.

Dr. J. SEAL, Buffalo, thought that when a person was in health and the mouth in a normal condition, a soft brush and plenty of water were all that were needed for cleansing the teeth. When the patient is sick the condition of the mouth is abnormal, and treatment to suit the individual case should be carried out under the eye of a competent dentist or physician.

Dr. A. E. MIMMACK, Buffalo, spoke of the importance of brushing the teeth in the direction of their length. He believed in the use of a stiff brush used in this manner and with tooth-powder daily.

Dr. L. MEISBURGER, Buffalo, did not think brushing the teeth was responsible for the destruction of the enamel sometimes observed, but that it was owing to a pathological condition.

Dr. F. MESSERSCHMITT, Rochester, said that patients as a rule did not know how to brush their teeth. They think if they draw the brush back and forth over the labial surfaces of the incisors, with an occasional rub on the buccal surfaces of the molars, that is sufficient, and neglect the inside surfaces altogether. He has a set of models in his office which he uses to show his patients how the teeth should be cleaned, and he thinks it helps them very much.

Dr. BLACK has his patients bring their brushes to his office and clean their teeth in his presence. By so doing he can observe what part of the teeth are slighted, and teach the patient how to reach every spot. This careful attention on his part he found to be effective in impressing upon his patients the necessity of more care and thoroughness on their own.

Dr. M. L. FAY, Buffalo, said that the best way to clean between the teeth was to use tooth-paste in connection with floss silk. First place a little paste around the tooth, then use the floss silk. There is a holder on the market that is very convenient.

Dr. C. W. STAINTON, Buffalo, said there was a time when Pilate asked, "What is truth?" And he thought a stranger listening to this discussion would be likely to ask the same question. He had in his time had many faiths in regard to the proper use of different dentifrices and tooth-brushes, but had gotten to that point where he put his dependence on a wooden tooth-pick; and would probably soon reach the point where he would believe, with Dr. Crawford, of Nashville, that the best and only necessary cleansing can be effected by simply filling the mouth with water and forcing it through the teeth.

Dr. BACHMAN, closing the discussion, said that patients did not appreciate the necessity of cleansing the teeth. Those who did give attention to it did not do it as thoroughly as it needs to be done. While he knew that there was danger in both acid and alkaline preparations when they were of inordinate strength, he was convinced that a little magnesia to correct the acidity of the mouth would be of advantage.

Evening Session.

At the evening session Dr. F. J. Capon, of Toronto, read the following paper:

Some Practical Details of Porcelain Inlay Work.

I have chosen this subject to answer a double purpose: To carry out my promise to your worthy president that I would write something pertaining to porcelain for the union meeting at Buffalo, and to make it a paper of practical details in answer to many letters asking various questions concerning a paper on the subject read at Albany in May and printed in the September Dental Cosmos.

Those who are versed in the subject will kindly bear with me should I make my listeners a kindergarten class.

In the daily rush for existence one has very little time for inquiry or experiments along a new line, so the great fascination of uncertainty is lost when details are wholesaled to those proposing to venture into this artistic field. The compounding of one's own materials, the crudeness of furnaces, and the uncertainty of shades, texture, and translucency were a part of the contention years ago, when our trials and spirits were *heated* and *cooled* in sympathy with the furnace. So art is turned into a toil, and details of porcelain are handed out for the benefit of *many* who will use and abuse them with no feeling of respect for the higher art to which they belong.

Artists, like poets, are born, not made. So there is every reason to believe that, although porcelain has many new admirers, only a small percentage will become experts, as it requires an artistic skill and careful manipulation that comparatively few operators are blessed with. I hope the "new admirers" of the inlay will not allow their ardent spirits to mislead them, and remember that judgment and discrimination should play a prominent part.

Although porcelain has many of the requirements of the ideal filling, yet it falls short of being the Mecca in having to depend on cements which disintegrate in the fluids of the mouth. It has at least a two-fold duty in dentistry, as it is particularly indicated in aged, delicate, or nervous patients who find the insertion of a large gold filling a tax on the nervous system. It is also indicated in those patients who are decidedly prejudiced against unsightly yellow patches of gold in the anterior teeth. The operator should be possessed of sound judgment, and should choose only those cases where it is properly indicated. If, however, they are few and porcelain comes to the aid, then I claim the up-to-date dentist should be equal to the demand of the times.

The uses of the porcelain inlay are limited, and should not be attempted in those places where it would be utterly inadequate to fill the use required of it.

The Furnace.—What furnace would I recommend to the beginner? That gas and other fuels have to give way to electricity as the superior mode of fusing porcelain is a question no longer. The great objection to the gas furnace, especially in the hands of a novice, is the "gassing" which takes place when combustion between the air and gas is not perfect. No single muffle is made that carbonic acid gas will not penetrate. It is computed that this gas will penetrate through steel an inch in thickness. If this is possible, how can we expect a platinum muffle .008 of an inch in thickness to keep these gases from coming in contact with the fusing porcelain, which no doubt is done even in perfect combustion, as when fusing a delicate yellow or pink enamel the colors will not be so true as those produced when electricity, oil, or coke is employed?

There are electric furnaces being placed on the market almost every day which are designed to fuse only the low-grade bodies, but even to accomplish this they are slow and liable at any moment to burn out or short-circuit. Several furnaces on the market are intended to obtain a higher fusing-point for higher-class bodies, but there have been none equal to the task until recently, when the Hammond electric furnace was placed before us. I think I am safe in saying it is by far the most perfect apparatus ever placed before the profession. Mr. Hammond has overcome the weak points usually found in electric furnaces. His is constructed on the inside wiring plan, so that every degree of heat given off by the wires is delivered direct to the muffle. The platinum used is of sufficient size to insure the heating of the furnace to the same degree as the wire itself. The current is under complete control of the operator; therefore all danger from burning-out is avoided, because any heat that is needed to fuse even the block bodies is far below the capacity of the platinum wires. In experimenting with this furnace I find that only five minutes is necessary for heating up, instead of the usual fifteen or twenty minutes. When the controlling lever has reached No. 4 step it will fuse Whiteley's or Consolidated bodies in less than two minutes, and with the lever on the next step, No. 5, it will fuse anything in the porcelain line (fusing White's or Justi's block bodies in seven minutes). These experiments have quite put me out of conceit with my gas furnace, which has been my friend for over twelve years. I have waited patiently for the electric furnace to be invented that would be capable of taking its place, and I think we now have one in the Hammond that can be relied upon.

Preparation of the Cavity.—I am not going to lay down any fixed rules for the preparation of cavities. However, when using porcelain there are many points that differ from that necessary in using gold, and these should be carefully adhered to. You will find that in this work, the same as in any other in dentistry, the operator should be blessed with a certain amount of what is called "gumption," whether it be in the preparation of the cavity or in the handling of the porcelain; and without it all dentistry would be an irksome duty, a difficult problem.

Besides the indications already mentioned for the use of porcelain, it also comes to the rescue of teeth that are of exceedingly frail and soft structure. I have already said that a good porcelain inlay is eminently better than a poor gold filling, and it is just in these cases where the "other dentist's" gold fillings are frequently a failure that even a poorly-made porcelain inlay would have a longer life, as when the worst has happened the cement is still left to line the cavity. Therefore in using porcelain in these cases one is able to preserve walls that would otherwise have to succumb to the chisel.

It is a mistake to think that porcelain inlays will be successful if made in mere veneers, trusting wholly upon the tenacity of the cement to retain them in position. The porcelain piece must have more or less body to it and the cavity more or less depth, otherwise the success of the filling is very questionable; the more surface of porcelain, the better chance the cement will have to do its work and the less chance of dislodgment. Inlays at the gum-margin of incisors and bicuspids are prone to this trouble of dislodgment if without reasonable depth of cavity, and the walls and floor of the cavity at right angles. I have yet to see the first dislodgment of a ground circular inlay of the How system—a system I always employ in small cavities on labial surfaces or gum-margins—where the circle will envelop the entire cavity. This proves that small inlays closely adapted to the walls of a cavity with a minimum amount of cement will give excellent results. Thus these gum-marginal cavities must be more than shallow, and are best prepared with a straight-side enamel bur which will leave the walls and floor at right angles to one another, the bur being large enough to take away the sharp angles at the mesial and distal sides of such cavities as are shown in Figs. 1 and 2.

FIG. 1.

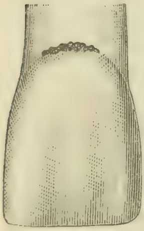


FIG. 2.

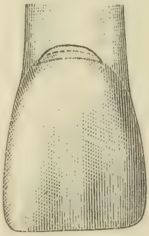


FIG. 3.

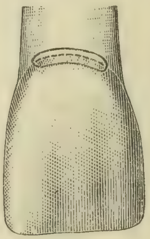


FIG. 4.

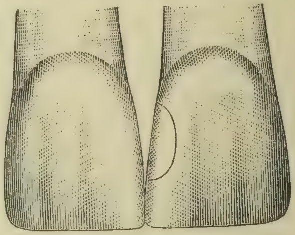


FIG. 5.

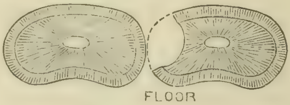


FIG. 6.

Fig. 2 shows the faulty angles. Fig. 3 shows the correct form of the cavity.

In the approximal cavities presenting themselves on the labio-mesial or labio-distal surfaces, as shown in Fig. 4, having a somewhat frail floor on the palatal aspect. I endeavor to save this floor, shown in Fig. 5, it being a considerable help in the retention of the inlay, the cement lines being fairly protected from the wash of the tongue. The chances of fracture of this thin palatal floor are slight, as there is little or no stress in occlusion, and the tenacious cement forms a guard. If the approximal cavity presents itself on the palatal aspect the same preparation stands good, but care should be taken to match cements to the tooth or the thin enamel over the cavity will be changed in color. In this class of cavities the ravages of decay have made (as a rule) sufficient depth of cavity with plenty of undercuts, making it necessary to cut away only enough overhanging wall to give the edge strength; which edge should be a well-defined right angle. In all cases it is imperative that there should be an easy access to the cavity, whether by cutting or by separation.

The preparation of approximal cavities demanding a contour reconstruction of the incisal angle are much the same as preparing for gold, gaining as much depth to cavity as the tooth will admit; which is gained mostly at the thick part of the tooth, making a decided undercut. If the contour is large some means of retention must be used at the incisive edge or doubtless the inlay will be short-lived.

Retention.—The retention of the first-named class (cavities at the necks of teeth) depends largely on the close and accurate fitting of the square side of the inlay to the perpendicular cavity wall, but if the inlay is deep enough it can be slightly grooved with a diamond disk or a knife-edge carborundum, and may be scored at the bottom to establish a better adhesion of the cement.

The pin-hole cavities are not usually a great success when made with a matrix, but are made perfect, as inlays go, by the grinding of a circular piece as before mentioned. These hardly need any grooving; in fact, are better without, as it might mar the close union, for they are ground to bind against the walls and cavity edge. The cement used in these cases requires to be somewhat thinner to allow the inlay to get home.

In case of a broken corner on a central or lateral, an inlay is rather a difficult matter to retain in position. They are at the thin portion of the tooth, which will allow of no body of porcelain to hold the contoured portion of the inlay; which inlay stands out of the cavity, say, two-thirds to the one-third inside the walls. Thus it is necessary to make an extra retention of such a piece with a platinum staple let into a groove made at the bottom of the cavity. Fig. 6 shows a triangular staple made of platinum wire No. 25, B. & S. gauge.

Fig. 7 represents the tooth with mesial corner gone; the dotted lines mark the depth of the cavity obtained by burring; the solid line shows the groove at the bottom of the cavity.

Fig. 8 shows a transverse section of the same.

Fig. 11 shows a cross-section of the matrix with triangular staple pushed through the bottom of it.

Fig. 9 is a sectional view with inlay in position.

The approximal contour of centrals and laterals is also very often difficult to retain, as in many cases the biting edge of the teeth is worn down by occlusion. The porcelain piece would soon be forced off by mastication, which is literally done on these teeth by people of the lymphatic type. The cavity is prepared as before mentioned, and a groove cut along the remaining incisive edge of the tooth in the manner for shoeing (Fig. 8).

The Matrix.—The platinum matrix is obtained from platinum $\frac{1}{1000}$ of an inch in thickness, which has first been made soft and pliable by placing a quantity of it in the oven of a furnace where a very high heat can be obtained. Platinum annealed under the blow-pipe or in a gas flame may become softer, but still has harshness which causes a springing, and is troublesome and less liable to work true than that which is annealed in the oven of the furnace. Now, a small piece of this platinum, sufficient in size to cover the cavity and some to spare, is laid over the orifice and carried to the edges of the cavity by a flat burnishing instrument and the surplus turned over the labial and lingual surfaces and grasped by the thumb and first finger; this keeps the platinum firmly in position, the grasp being maintained until the burnishing is completed.

FIG. 7.

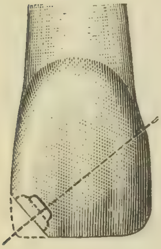


FIG. 8.

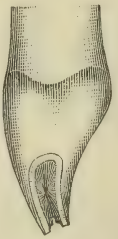


FIG. 9.

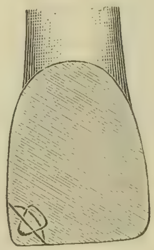


FIG. 10.

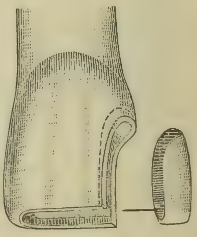
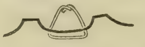


FIG. 11.



Now, with a ball-pointed burnisher as large as the cavity will admit, the edges of the cavity are outlined on the platinum. This will prevent kinking on the edges; this is most essential for close jointing. At this stage cotton batting, spunk, or bibulous paper can be used as a cushion to force the platinum into the cavity, but it has a limited usefulness, and the burnishing is continued along the outer edges of the cavity, avoiding the center, as the burnisher is liable to break through. By carefully and gradually coming to the center one is able to stretch the platinum until it will cover the entire walls and floor of the cavity without breaking the platinum. By keeping it intact it has the advantage of keeping the porcelain close to the walls of the cavity, and the matrix is less liable to change form while being removed. When it is impossible to form the matrix without breaking there is little harm done, as the body will bridge over the break, the shrinkage causing a slight concavity in the inlay. This concavity is no detriment in the large cavities when there is something to come and go on, but in the small ones the advantage of depth is impaired.

To retain the contour at its incisive edge a piece of platinum wire, No. 24 or 25, is pushed through the matrix just opposite the floor of the groove on the cutting edge, and runs the full length of the groove. Some dampened Close's body is placed in the matrix, the moisture taken up with bibulous paper, and the matrix withdrawn, bringing with it the wire in its proper relation. More body is added to form an approximate contour, the outlined edge of the cavity on the matrix being kept free from the body.

In using pins as retainers in any position the same method will be found to be quick and better than investing and soldering, as there is a danger of having an excess of gold, which is liable to volatilize and change the shade of the inlay. The body in the matrix should have the moisture thoroughly extracted from it by using any quickly absorbing material, as linen doilies, or bibulous or blotting paper. By rapping on the tweezers which hold the matrix in grasp more moisture will come to the surface, which is again taken up by the absorbents.

The work is now ready to be placed at the mouth of the muffle or oven and dried for a few seconds before placing wholly into the furnace. The first heating is called "biscuiting," which is judged by the first appearance of gloss. No set time can be given for doing this or any work in the furnace, as each piece may differ in size or quality of body, and therefore differ in time of baking. Besides, the temperature of the furnace may vary even with electricity.

In the case of a large contour under construction I like to carry the heat to slightly more than a biscuit, as the amount of shrinkage at the second baking can be better determined.

The piece is now ready to be tried into the cavity, having first cut away with small scissors the surplus platinum, leaving only a narrow margin along the line of demarkation of the cavity edge. At this fitting is the proper time to perfect the fine edges, as the platinum in the matrix has been thoroughly annealed and the small margins are more easily laid closely to the tooth-enamel edges, giving an opportunity to work out any kink or false edge that may have formed.

Shading.—The question of shade should be determined, with the sample shades at hand, before leaving the patient's side. In a large contour it is often a matter of two or three different shades from the gum-margin to the cutting-edge. These different bodies are chosen and laid on the rough contour already formed in the biscuit, and are blended by the moisture running them together as well by the second baking.

Mr. Whiteley, of New York, sent me a full line of his excellent shades, which serve well as an enamel upon the higher grade bodies in the final baking. Good results can be had by mixing Whiteley bodies with higher grades, making a nice medium with a splendid variety of colors. All teeth on the yellow shade are comparatively easy to match, but the grays, blues, and browns are more troublesome to get exact. In devitalized teeth it is better to have the shade a little on the dark side than on the light, and in the light-colored teeth it is better to err on the light side. If the shade of the tooth is a difficult one to match and you are not quite sure of it, then do not build to full limit of contour, which will allow the changing of the shade a little in a third baking. Twice baking is usually sufficient for one who is accustomed to the work, unless the shading is out or a greater amount of shrinkage has taken place, especially at the margins, than had been reckoned on. After the final baking the piece is tried into place both before and after the platinum is peeled from the porcelain, which comes away readily; pulling from the edges toward the center to avoid breaking any fine edges of porcelain, which might spoil what would have been a satisfactory joint.

At this stage it is well to apply the rubber dam in all cases, and thoroughly dry out the cavity. The inlay is washed with alcohol to remove any grit made in obtaining the grooves.

The *cementing* of the inlay is an important step. Considerable judgment should be used in selecting the colors of cement to harmonize with the enamel and the inlay, as the shading you have been so careful in obtaining may be spoiled by changing the shade of the overhanging enamel or by throwing a dense shade through the inlay.

Of late years I have confined myself to the Harvard cement, which can be mixed to a smooth, heavy consistence without forming granulations before the inlay is got home; a trouble that often happens with other cements, when one is compelled to remove the inlay, wash out the granulations of cement, and try again,—a very unpleasant procedure, to say the least. The inlay in position, the setting of the cement makes an important wait, as here lies the weakness of this artistic work. So if you hasten at this point you may lose it later, when your fine piece of porcelain is brought back to you in the corner of a handkerchief. The setting of the cement can be somewhat hastened by placing paraffin over it and applying a heated instrument, and continuing with hot air. When sufficiently dried use sand-paper strips, and again the paraffin with a heated instrument.

The large contour is not yet complete, as the wire in the groove at the cutting-edge must be built in with gold and platinum; which also serves to insure the safety of the contour from certain dislodgment by stopping the wearing of the tooth.

Fig. 10 shows the porcelain complete with wire ready to be adjusted in position.

On the sample case passed around an example of the contour will be noticed on the left central incisor; also on the left first bicuspid the same idea was carried into effect, having the wire lying in a groove in the sulcus and anchored with a gold filling.

I had intended taking up the "jacket" and "cup" crowns, having been asked for details of them, but the paper already has exhausted plenty of your valuable time and patience. I hope it has interested you enough to evoke a discussion.

Discussion.

Dr. GEO. J. FREY, Buffalo, had been much interested in this excellent paper, and congratulated the convention upon hearing a paper that thoroughly covered the subject of which it treated. He had a suggestion to offer: In burnishing the platinum into the cavity to make the matrix he used unvulcanized rubber, which is very springy under the burnisher, and will pack itself closely into the cavity. He had seen some beautiful porcelain work done by Dr. Jenkins, and had gotten a furnace and was experimenting with porcelain, and had done some practical work. He was sorry Dr. Capon had not said more about the different kinds of body which he used. In his own experience with two different kinds he found very great difficulty in getting the proper shade.

Dr. F. Low, Buffalo, had attended a clinic in New York where a gentleman who had a secret way of getting the exact shade exhibited his method, which was to select a porcelain tooth of the required shade, crush it, and use it for body, of which he makes the porcelain filling. He asked Dr. Capon what he thought of this method.

Dr. F. Messerschmitt, Rochester, had done little in porcelain work, but had done considerable in continuous-gum work; and in making sets he often broke up old teeth and put them in with the powdered porcelain body, but it was to avoid the shrinkage of the porcelain. He thought it might be well to follow the same practice in inlay work, with the same end in view.

Dr. Heckler said that he had limited experience with the use of porcelain; had been working at it about a year, and did not feel that the results he had obtained would permit him to judge as to the success of the method, as some of the porcelain crowns he had put on had broken off on account of faulty construction. He had inserted a number of crescent-shaped fillings at the necks of the incisors, and thought there was no place where porcelain inlays would prove more acceptable than here, as the show of gold in this position was especially disagreeable. He doubted the usefulness of porcelain inlays at the corners of incisors. Such fillings did not seem to promise permanency. The use of pieces of porcelain teeth in porcelain fillings was good practice. It reduced shrinkage, made the shade more reliable, and strengthened the filling.

Dr. A. E. Mimmack, Buffalo, said that many fillings at the necks of incisors running from mesial to distal side would of necessity be saddle-shaped, and asked if porcelain could be safely used in these cases.

Dr. Capon said that he had filled a great many such extended cavities, and had seen this week one that he had inserted eight years ago, and it was good to-day, though it had broken in the middle while adjusting in position, having a decided crescent shape, extending from the upper third mesially along the gum-margin and taking in the upper third of the distal side. He had put many such fillings in, and, though they were difficult, they have been quite successful.

In regard to porcelain fillings in molars, he had done considerable of this work in molars in former years, but does not do it today. Porcelain is not indicated in molars, but may be used in cases of nervous patients who have a strong aversion to gold fillings, or who cannot bear the strain of having gold fillings done. In some cases homeopathic physicians object to having amalgam fillings put in for such patients. Only in such cases would he advise their use in molars. Dr. Low spoke of the use of teeth ground up and used to produce the exact shade in fillings. There is no advantage in this increased strength. There is nothing gained in the shading of the filling, as other body must be mixed with it, and the shade will depend entirely on that. Porcelain teeth are made of such high-fusing body that they could not be melted in any furnace that has been offered to the profession except the Land oil furnace and the Hammond electric furnace. In continuous-gum work the checking will be largely avoided if care is taken to thoroughly dry out the body before baking. The subject of soldering teeth for strength in crown-work was taken up in his paper read in Albany, also the comparative strength of an all-porcelain crown over that of a porcelain face being soldered to a backing; in the former the facing is etched in a solid mass to its backing of porcelain, while in the other case the facing is held by two little pins, around which the porcelain is often invisibly checked and liable to dislodgment with slight pressure. The higher the fusing-point of the body used the greater the strength.

Dr. L. MEISBURGER, Buffalo, asked Dr. Capon what kind of body he used.

Dr. CAPON said he had gone into that question in his former paper. His favorite was Close's body; Tees's body was in the same class. Nearly every porcelain filling he made was made partly of Close's body. Sometimes some other body was used in connection with Close's, in order to get a particular shade of color. In large contours we naturally want to get something that will give the least shrinkage. Low-grade bodies shrink badly, and the colors will burn out if you run the heat a little too high. High-grade bodies shrink less, and cannot burn out the color, giving a more natural appearance. He takes great pains with his shades, and finds that his knowledge of the different bodies often enables him to succeed in getting a difficult shade by combining two or more bodies that he could not get in any single one. This is done in the second baking. The higher the grade of body the better the work will be. If we could use the block bodies, such as White's and Justi's use in their teeth, we could do much better work than is possible with the lower-grade bodies we have to use now. Crowns are his favorite porcelain work, inlays being used only where properly indicated.

Dr. C. S. BUTLER spoke of the skill with which Dr. Capon drew the designs on the blackboard, from which the paper was illustrated. He said it was evident that he had artistic ability; not only such as was required to select and place a porcelain filling, but in other directions as well; and unless one has something of this artistic temperament he cannot hope to succeed in porcelain work.

Dr. PEARSON, of Toronto, said that Dr. Capon's work required the most artistic skill, and most severely taxed the patience of a most patient man to do this work in which he succeeds so well. In his estimation Dr. Capon's work is quite equal to that of any of the porcelain workers on this continent, or any we have seen by men of the other continent. He was delighted to be at the meeting, and that a Canadian had read such a paper and exhibited such work.

Dr. BUTLER said he had been pleased to hear this testimony of high appreciation of Dr. Capon by one of his own countrymen, and was glad to be able to state that he is as equally appreciated on this side of the line.

The subject was passed, and the convention adjourned until the next day.

(To be continued.)

MARYLAND STATE DENTAL ASSOCIATION.

AT a meeting of the Maryland State Dental Association, in Baltimore, November 10, 1900, the following report was received from a committee appointed at a previous meeting, and upon motion was accepted and adopted:

BALTIMORE, November 10, 1900.

TO THE OFFICERS AND MEMBERS OF THE MARYLAND STATE DENTAL ASSOCIATION:

Gentlemen,—The undersigned having been appointed a committee "to formulate a plan for the examination of the teeth of children in the public schools of this city," have considered the matter and have agreed upon the following report:

Believing that the time has arrived for the inaguration of such a movement as the resolution contemplated, and without detailing the reasons which have brought them to this conclusion, your committee respectfully recommend the adoption of the following resolutions:

Resolved (1)—That said committee take the proper steps to secure the inspection of the teeth and mouths of children in a limited number of public schools, say not less than five schools.

Resolved (2)—That said committee, if permission is secured, provide brief talks on the care of the teeth to the students of the City College and High Schools.

Resolved (3)—That said committee invite members of this association, friendly to its objects, to become their colleagues and accompany them to the School Board, and if possible induce the school commissioners to co-operate after explaining to them the character and importance of the movement.

Resolved (4)—That each visiting dentist have assistants to aid in sterilizing instruments and in filling out examination blanks, who may be students from the graduating classes of the several dental schools indorsed by the deans.

(Signed) RICHARD GRADY,
B. HOLLY SMITH,
L. WILSON DAVIS,
GEO. E. HARDY,
Committee.

DENTAL SOCIETY ANNOUNCEMENTS.

INSTITUTE OF DENTAL PEDAGOGICS.

THE eighth annual meeting will convene on Thursday, December 27, 1900, at 10 o'clock A.M., at the Maxwell House, Nashville, Tenn. Sessions December 27, 28, and 29, 1900. A cordial invitation is extended to all teachers particularly, and to any member of the profession who has a ripe thought to offer.

Thursday, December 27.

10.00 A.M.—Organization; executive business.

11.00 A.M.—President's Address. Discussion by J. Taft and W. C. Barrett.

12.00 M.—"The Use of Flexible Rubber in Orthodontia and other Technic Teaching." By Dr. J. Q. Byram. Discussion by Drs. S. H. Guilford, C. S. Case, Walter H. Fundenberg, W. W. Evans, and W. E. Grant.

2.00 P.M.—"Teaching of Materia Medica and Therapeutics." By Dr. A. H. Peck. Discussion by Drs. James Truman, John I. Hart, S. W. Foster, G. E. Hunt, and J. D. Patterson.

5.00 P.M.—Exhibit open.

8.15 P.M.—"The Use of the Lantern in Teaching Dental Histology in its Relation to Operative Dentistry." By Dr. Fred Noyes. Discussion by Drs. A. H. Thompson, I. N. Bromell, W. G. Foster, H. T. Smith, and Louis C. LeRoy.

Friday, December 28.

9.00 A.M.—Exhibit open.

10.00 A.M.—"Presentation of the Technic of Crown- and Bridge-Work, Metal and Porcelain." By Dr. Thomas E. Weeks. Discussion by Drs. Otto Arnold, Fred. R. Sandusky, R. H. Nones, R. H. Jewett, and N. S. Hoff.

1.00 P.M.—Exhibit open.

2.00 P.M.—"Class-room Method of Teaching Oral Surgery." By Dr. G. V. I. Brown. Discussion by Drs. M. H. Cryer, T. S. Gilmer, Eugene S. Talbot, J. Y. Crawford, and Edw. M. Kittig.

4.00 P.M.—"The Teaching of Dental Technics." By Dr. A. E. Webster, Toronto. Discussion by Drs. G. V. Black, T. S. Tenny, and G. W. Dittman.

Saturday, December 29.

9.00 A.M.—Exhibit open.

10.00 A.M.—"Class-room Method of Teaching Prosthetic Dentistry." By Dr. Grant Molyneaux. Discussion by Drs. J. H. Kennerly, J. P. Gray, J. Bond Littig, T. M. Allen, and A. O. Hunt.

11.30 A.M.—Reports from Committees on Operative and Prosthetic Syllabi.

12.00 M.—Election of officers.

The exhibits should be sent to the Maxwell House, care of Dr. J. A. Dale or Dr. George H. Wilson, master of exhibits, before the holiday rush.

Let every school have a representative present, and every teacher feel that these meetings are for him.

Fraternally,
HENRY W. MORGAN,
DAVID M. CATTELL,
WALTER E. WILLMOTT, *Executive Board.*

EDITORIAL.

IF NOT DENTAL LEGISLATION, THEN WHAT?

ONE who carefully observes the current of events which indicate the trend of thought in our profession cannot fail to have noted the fact that professional thought has a tendency to concentrate itself around certain ideas from time to time, and that these ideas are consequently brought more prominently into view in a manner somewhat analogous to the formation of storm centers which follow disturbances in the ordinary atmospheric conditions. This tendency is particularly noticeable with reference to questions affecting dental education and dental legislation. A principle in connection with its practical working plan is enunciated, put into effective operation, and works out its natural result. A new vantage-ground in professional progress is attained, and from this new view-point preparations are made for the next advanced step. The change from one point to another is not made without opposition, mainly because, having become accustomed to the old, and often because we have come to regard it as the best of its kind, we hesitate in taking a new step which not only interferes with the existing order of things, but which brings with it new responsibilities and greater activities.

The principle of state control of the standards of qualification for practitioners of the healing art is by no means a modern doctrine. It may not be generally known that as early as the year 1700 a law of France prescribed that all intending practitioners of dentistry should submit themselves to a board of examiners, who should pass upon their qualifications before the candidates could be permitted to practice their profession. In no case in any country of the world has the inherent right of the state expressed in this principle been abrogated by the judiciary. The only cases involving contests as to the authority of the state through its executive boards which have resulted in decisions adverse to the state boards are those cases involving a definition of the rights of the board under a given statute, but never in any instance has the constitutional right of a legislature to enact a licensing law been successfully attacked. It would seem, in this stage of our progress, to be a work of supererogation to attempt to defend the inherent right of the state to legislate with a view to protect its citizens from the effects of incompetent dental practice. What is needed, however, is a much clearer understanding of the function of dental legislation by those who ask for it, and a better practical knowledge of how that function is to be equitably administered.

In various quarters criticism has been rife with respect to the work of the state boards, and, unfortunately, the great bulk of this criticism bears upon its face the evidences of a misconception of the principles upon which dental legislation is based and the ends sought to be attained thereby. It is criticism of the destructive, rather than of the constructive type. We admit that criticism of any sort has its value. Not many years ago the popular press of this country amused itself with a discussion of the question, "Is marriage a failure?" The discussions brought out many criticisms tending to show imperfections in that feature of social relationship. The discussion was practically terminated by the conclusion expressed by one wise newspaper man who said, with respect to the system, "It may be a failure, but at present it appears to be the best arrangement which we have at our command." This conclusion is not without its points of applicability to the fundamental principles of dental legislation. We have several times pointed out in these pages that dental legislation is undertaken for the protection of the public against the results of ignorant and incompetent dental service. It never was intended to and never can protect the dental profession from the competition of advertising dentists. It will not prevent the opening of dental parlors or prohibit the proprietors from advertising their work, or reducing their prices, or carrying on their business upon business lines instead of so-called professional lines. What it will and does do with respect to establishments of that character is to compel them to employ only qualified assistants, in doing which it has fulfilled its function, theoretically at least, of securing to the public who patronize establishments of that class a better and more competent dental service.

Another class of criticism upon the machinery of the dental law, and which has been pronounced somewhat emphatically of late, is the incompetency of those who constitute the examining bodies on behalf of the state. Granting that criticisms of this character have a foundation in fact, let us take steps to correct the fault without seeking to destroy the principle at stake. The remedy is near our hand, and entirely within the control of the dental profession, which created the state laws and is responsible for the appointment of examining boards.

The work of the state boards is peculiar, in that it is essentially a matter of public record. It is true that many of the dental statutes do not explicitly specify that the results of the examination of candidates shall be made matters of public record. Nevertheless, whether so expressed or not, the higher courts have determined that these results are *de facto* matters of public record, and are therefore to be open to public inspection by parties in interest.

In this principle lies the safeguard both of the public and of the dental profession against incompetency upon the part of the dental examiner. More than that, it furnishes the greatest spur possible for efficient and competent work upon the part of the examiner. The question of incompetency of dental examiners is the point of attack and criticism by the educational faculties, but let it be remembered in giving due weight to these criticisms that no public showing of the methods of education or the character of examination has been by law ever required of the teaching bodies in dentistry. It is true that many have voluntarily given information on these points through their college announcements and otherwise, but they are not so compelled to do by law; in which particular their position differs materially from that of the state examiner. It is highly probable that if the final examination questions of all of the colleges in this country were published each year, not a few occupying professorial chairs would find themselves open to the same kind of criticism which is now being made with respect to dental examining bodies. It must not be forgotten that our state legislation is a very heterogeneous mixture of good, bad, and indifferent statutes. Numbers of them apparently give the widest latitude of discretion to the state board as to the matter and manner of its examinations. This is a fault of detail which should be corrected, and which has nothing to do with the main principle of dental legislation. Unless the details of a statute are so framed as to carry into effect the principles upon which legislation is based the act fails of its purpose, and should be reconstructed.

Where a statute is properly framed and is correctly applied it acts as a wholesome corrective upon the graduation of incompetent men by the colleges. The very fact that many graduates fail to pass the state board examination is evidence that incompetent men are graduated from time to time by the colleges; of course assuming that the state board examination is one which is correctly arranged and fairly conducted with a view to sifting out the incompetent graduate. But it is claimed that the competency of the graduate cuts no figure, and is without effect when the examination is conducted by an incompetent board.

Granting this to be true, we still hold that the remedy is in the hands of the dental profession, and that it is their duty to see to it that competent examiners are appointed. Certainly the remedy is not to be found in the abrogation of state legislation, nor is it the part of wisdom, because occasionally a board or an examiner is found to be unfit, to argue that dental legislation is a failure.

Let us consider for a moment what would be the effect were all dental legislation abolished. It would give to every college in the country the right to license its own graduates; that is to say, instead of concentrating the licensing power in state boards, under the direct, or at least indirect, control of the profession of the state, it would transfer this power to the dental schools, most of which have a commercial interest in graduating as large classes as possible. Men could be graduated under such a condition of affairs without let or hindrance. There would be a lessened incentive to the would-be practitioner to secure the advantages of a college training, for, there being no law to prevent it, any one might set up as a practitioner of dentistry, regardless of his fitness for practice, and no one could prevent it.

It is regrettable that the spirit of criticism which has recently arisen with respect to this matter does not seem to be based either upon a conception of the good to be attained by dental legislation or to contain any suggestion for a better alternative in case dental legislation as a means to that end were abolished.

We ask for a careful consideration of this problem, and, in the absence of a better plan for protecting the public from incompetency and the dental profession from an influx of charlatanism and ignorant competition, we would suggest that the discussion of the problem be confined to the means of improving that which is defective in our methods of applying the principle, rather than in attacks upon the principle itself.

THREE IMPORTANT PAPERS.

WHILE it is not our custom to call attention editorially to publications appearing in our pages, yet, without creating any invidious distinctions and solely with the desire to place before our readers that which seems to indicate important advances in our literature, we take pleasure in asking careful consideration of the subject-matter of three papers presented to the International Dental Congress in Paris.

First, the new line of research and the conclusions embodied in the paper by Dr. Michaels, of Paris, on "Sialo-Semeiology." We regret that the magnitude of the paper and our space limitations prevented its publication in full, but we have endeavored to give an epitome of his important work and his conclusions, which, if they bear the test of further investigation and are found to be based upon correct observation and reasoning, will mark an advance in the study of the great problems of nutrition in their bearing upon pathological states which cannot fail to have a far-reaching application and immense value.

The problem of immunity to dental caries is one which must be worked out before we can hope to realize that ideal which is common to all workers in pathology and therapeutics,—namely, successful prophylaxis. The researches of Miller, Black, Williams, and others teach that when we deal with the problem of immunity to dental caries we have to deal with a variant from the usual order of reasoning in respect to immunity in general, in that the condition cannot be attained through any treatment of the dental organs which will render them less susceptible to the invasion of caries,—a result which has been found to be quite possible of attainment in establishing immunity of the vascular tissues to invasions of certain diseased processes. In the case of the teeth, however, immunity to carious invasion must be worked out in the tooth-environment, rendering it uninhabitable to the decay-producing bacteria.

Dr. Michaels's research is an important step in that direction; important to the extent that he has been able to determine the histo-chemical conditions of the oral fluids of those who appear to be immune to dental caries, and he has found that these conditions are markedly different to those where caries is active, but are directly related to the health-status of the individual, or, otherwise expressed, to the kind and degree of the vital potential exhibited in these cases. Whether nutrition may be so influenced as to artificially establish these desirable vital conditions and so secure immunity to dental caries is matter for further research.

Dr. Michaels has thrown a ray of scientific light on the problem of dental prophylaxis, and has clearly indicated the direction from which greater light on the problem may be expected to come.

The article by Dr. Loup, on "Mercurial Stomatitis," amounts to a demonstration of the etiology of the disorder in question. He has shown that the stomatitis is essentially a germ disease, and that the *rôle* played by the mercury in the disorder is simply that of a predisposing cause, acting as a disturber of nutrition and depressor of vital resistance in the oral tissues to a point where invasion by mouth bacteria becomes possible. His demonstration that mercurial stomatitis, so called, may be cured by irrigations with mercuric chlorid solution is a striking example of the value of precise scientific research in the domain of pathology and therapeutics.

The article by Mr. T. E. Constant is a plausible and ingenious explanation of the mode of propulsion of erupting teeth, and the only one thus far offered which is sufficiently general in its applicability to cover the normal as well as all cases of variation therefrom in the eruption process.

CORRECTION.

In Dr. J. Choquet's paper, published in our October issue, the test for indol referred to by him (see page 970) appears as "potassium nitrate." It should be *potassium nitrite.*

BIBLIOGRAPHICAL.

THE AMERICAN TEXT-BOOK OF OPERATIVE DENTISTRY. In Contributions by Eminent American Authorities. Edited by EDWARD C. KIRK, D.D.S., Professor of Clinical Dentistry, University of Pennsylvania, Department of Dentistry. Second Edition, Revised and Enlarged. In one handsome octavo volume, pp. 857, with 897 engravings. Cloth, $6.00; leather, $7.00. Lea Brothers & Co., Philadelphia and New York, 1900.

The rapid exhaustion of the first edition of the "American Text-Book of Operative Dentistry" clearly demonstrates the fact that its value as a factor in the inculcation of dental principles has been fully appreciated by dental teachers and students, and by the profession at large.

In view of the completeness of the first edition, it may seem difficult to conceive that a revision should so soon have been found necessary, but as dentistry is among the professions that are rapidly ascending the scale of progress, and as the effects of this daily advancement had to be intelligently and fully recorded in order to make them known to the profession, a revision of the first edition became imperative.

The considerable number of topics discussed in the first edition have been thoroughly revised and wherever necessary new matter has been added, so that dentistry can congratulate itself in possessing a model work on the principles and practice of operative dentistry.

Each chapter of the work has been revised by its respective author, who, in many cases, has extended his contribution, so that the new edition contains within its pages all the advances made upon the topics of which it treats.

Among the new chapters is one by Professor Frederick B. Noyes on "Dental Histology in Reference to Operative Dentistry." This is a valuable addition to the revised work; a thorough understanding of this chapter will enable the student or practitioner to prepare cavities for the reception of fillings on entirely scientific lines and to operate in a manner best calculated to prevent a recurrence of caries, the *bête noire* of dentistry.

Medicine and the collateral sciences have made such marked progress during the past few years that at last the avenues of entrance, pathogenesis, resistance and strength of the majority of micro-organisms are well known and understood facts, and as the mouth is the habitat of a great proportion of these lifedestroyers the dangers surrounding the manipulation of contaminated dental instruments are very great; consequently the necessity of knowing the most acceptable methods of destroying these infectious agents has become an absolute one. It is for these reasons that Chapter IV, which is from the experienced pen of Professor Truman, is a very valuable and important addition. This chapter treats of the transmission of oral diseases, external infection, infection through implantation and transplantation, and of the agents used for sterilization.

The chapters by Dr. Jack have been thoroughly revised by the author; of these Chapter VII has been the most favored in regard to the addition of new matter.

Porcelain Inlays, which represent one of the most important and useful additions to modern dentistry, have received due attention. The chapter on this subject has been entirely rewritten by a practitioner whose ability in this direction is well known.

The chapter on Orthodontia has been carefully revised and enlarged by its author, Dr. Goddard, bringing the treatment of the subject in harmony with the latest developments in that specialty.

An examination of all the other chapters reveals an extraordinary amount of care and fullness of treatment. The harmony achieved in treating and co-ordinating the different subjects is worthy of much praise, and if to all this we add the excellence of the typographical work we must conclude that the second edition of the "American Text-Book of Operative Dentistry" is easily the foremost work of its kind in our literature. J. E.

OBITUARY.

DR. GEORGE L. COOKE.

Died, August 3, 1900, at his summer residence, Cottage City, Mass., George Lamb Cooke, D.D.S., of Milford, Mass., in his seventy-seventh year.

Dr. Cooke was born in Hadley, Mass., October 2, 1823. For nearly half a century he has been a resident of Milford, Mass. His first insight into the art of dentistry was obtained in the office of his brother, Dr. Albert A. Cooke, of Milford, in 1851 and 1852. He afterward attended the Baltimore College of Dental Surgery, graduating in 1853.

For some years he practiced in the office of his brother, later becoming his partner. After the lapse of about twenty years he withdrew and set up an independent office. Here he built up a large and lucrative practice. He sought the advancement of dentistry, and was a member of the Massachusetts State Dental Society.

Dr. Cooke made his mark as well in religious and municipal circles as in professional life. The Methodist Church in Milford had in him one of its best officers. He was superintendent of its Sunday School for forty-six years.

Dr. Cooke married, September 19, 1854, at North Brookfield, Mass., Miss Emeline A. Clarke, who survives him. Besides his widow he leaves one son, Dr. William P. Cooke, of Boston, and two daughters, Miss S. B. Cooke and Miss M. T. Cooke, of Milford.

RESOLUTIONS UPON THE DEATH OF DR. H. H. BURCHARD.

At the regular meeting of the Academy of Stomatology, held Tuesday evening, October 23, 1900, the Committee on Resolutions upon the Death of Dr. Henry H. Burchard submitted the following, which were accepted and adopted:

Whereas, Henry H. Burchard, M.D., D.D.S., has been removed by death from the scene of his toils and his honors; therefore, be it

Resolved, As the sense of this society, that in the death of Dr. Burchard the Academy of Stomatology has lost one of its most brilliant and useful members, and the dental profession one of its most earnest workers.

As one of its organizers he was foremost in the endeavor to establish the Academy of Stomatology upon a plane of high professional usefulness, and was ever active in advancing its interest by contributing his own work and enlisting the co-operation of others. He gave unselfishly of his energies and best endeavors even when physically unfitted for the task. His active brain not only stimulated thought and discussion at the sessions of the Academy, but his suggestive help in the ordering of its affairs was always a material aid in its progress.

He was earnest and enthusiastic in his efforts to impart his knowledge to others. As a teacher he was clear, logical, and forcible. These qualities he evinced both as a writer and as a speaker.

As a man Dr. Burchard was genial and affable in disposition, ever ready to sacrifice his own time and strength whenever it was within his power to aid others, and especially those who were earnestly working in the field of dental advancement. In his brief and brilliant career as writer and teacher he had attained remarkable distinction, and though his untimely decease has occurred at an age when the promise of still greater achievements seemed clearly before him, he nevertheless attained an eminence in his profession as teacher, writer, and investigator seldom reached by others, and less frequently by those of his short period of life.

Resolved, That these resolutions be spread upon the minutes of the Academy, and that a copy be transmitted to his family, and be published in the dental journals.

Edwin T. Darby,
S. H. Guilford,
Edward C. Kirk, *Committee.*

Archibald C. Eglin, *Secretary.*

PUBLISHER'S NOTICE.

THE END OF THE VOLUME.

WITH this issue the DENTAL COSMOS completes its forty-second volume of continuous publication.

With this issue, also, the great majority of subscriptions terminate. Those subscribers who find within the front cover of the December number a bill for the next volume (the forty-third) will kindly accept its presence as a notification of the expiration of their subscription and an invitation to renew. This bill is not charged up; it is merely a reminder to those who receive it that the time has arrived when a renewal is in order. We shall be glad to receive these renewals as promptly as possible.

Let us state that all subscriptions not renewed by the time the next number after their expiration is published are considered to have lapsed. We do not continue to send the DENTAL COSMOS after the lapsing of the subscription. Of course it can be renewed at any time and the missing numbers can be supplied, but to avoid any break in the receipt of the monthly issues the renewal should be made promptly.

In presenting this last number for the nineteenth century we desire to return our thanks to those who have sustained our efforts by their contributions to the pages of our magazine and by their subscriptions. We have endeavored at all times to make it a very present aid in upbuilding the science and art of dentistry. We believe that no small share of the credit for the present proud position of the profession is due to the fact that dentists with ideas to put before their fellows have always had in the DENTAL COSMOS an organ which halted at no expense necessary to present them in such form as to afford the fullest understanding. To the men who have offered these ideas the thanks of the DENTAL COSMOS are due, and are here gratefully tendered. Without them its mission would have been a monotonous threshing of old straw. It afforded them the means to lead the profession into new paths of thought and achievement, and in so doing became itself the leading representative of progressive dental journalism.

The DENTAL COSMOS purposes to hold its position. It will still continue to lead in the effort for a higher and yet more enlightened practice of dentistry. The more enlightened the practice, the better the practical result. That is what we aim for.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING OCTOBER, 1900.

Oct. 2.—No. 659,039, to CARL REININGHAUS. Artificial teeth.
" " —No. 659,052, to VASSAR CRENSHAW. Head-rest.
" " —No. 659,196, to AUGUST P. JOHNSON. Pivot teeth.
" *9.*—No. 659,206, to JOHN P. CARMICHAEL. Artificial crown.
" " —No. 659,216, to CHAS. B. DOWLING and WM. D. DURHAM. Dental chair.
" " —No. 659,531, to GEO. R. JOHNSON. Dental articulator.
" " —No. 659,593, to CHAS. W. RICHARDS. Tooth-brush.
" *16.*—No. 659,684, to JOHN A. W. LUNDBORG. Dental rubber-dam holder.
" " —No. 659 747, to HARTWIG and FELTMANN. Dental vulcanizer.
" " —No. 659,871, to THEO. G. LEWIS. Dental articulator.
" " —No. 659,886, to COURTLAND G. CAPWELL. Dental cervical clamp.
" *23.*—No. 660,172, to HERBERT J. TARR. Dental cuspidor.
" " —No. 660,194, to CLARENCE D. LUKENS. Tooth-straightening device.
" " —No. 660,319, to JOSEPH F. TWIST. Apparatus for making seamless tooth-crowns.
" " —No. 660,334, to FREDERIC A. PEESO. Stripper for punches.
" " —No. 660,335, to FREDERIC A. PEESO. Punch.
" " —No. 660,411, to ROBERT BLUM. Dental plugger.
" " —No. 660,435, to CARL G. HILGENBERG and HENRY R. LOPER. Dentifrice bottle.
" *30.*—No. 660,677, to DAVID J. ARCHER. Tooth-brush.
" " —No. 660,694, to JAS. E. WATERBURY. Adjustable head-rest.
" " —No. 660,713, to THOS. S. WATSON. Electric motor.
" " —No. 660,867, to CURT OSTMANN. Electro-magnetic tooth-stopping hammer.
" " —No. 660,943, to HERMANN BAUERMEISTER. Method of preparing dental remedies.

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THE S. S. WHITE DENTAL MFG. CO.

Please send me the **Dental Cosmos** *for 1901, for which*

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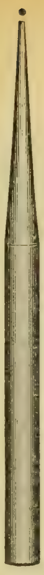

HAND-PIECE AND ENGINE ATTACHMENT TOOLS.

In taking apart and putting together engine hand-pieces and similar appliances, small suitable Screw-Drivers are required. A neat Bodkin is also a better aid in adjusting and tightening than an old excavator.

We have recently made the two sizes of a neat form of Screw-Driver shown. The smaller (No. 3) is about $\frac{3}{64}$, the larger (No. 4) about $\frac{5}{64}$ inch across the working point. They thus supplement Nos. 1 and 2 (see next page), affording a size smaller and an intermediate size.

The Bodkin will be found well adapted to its use.

Price, Screw-Drivers, Nos. 3 and 4. .	each	$0.30
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FREE TOOLS FOR DENTAL ENGINES.

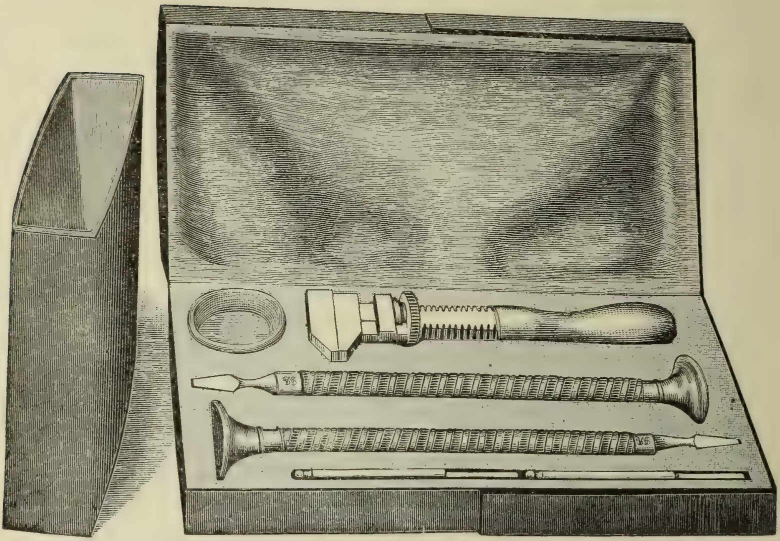
We have added considerably to the free equipment which goes with our foot-power Dental Engines, of all styles as now sold, including in it several tools and appliances which will be found convenient in taking care of hand-pieces, attachments, etc.

The free equipment now consists of:

7 Selected "Revelation" Burs.
1 Drill.
1 Plug-Finishing Bur.
2 Corundum Points, mounted.
1 Screw-Head Mandrel.
1 Screw-Shoulder Mandrel.
1 Screw Porte-Polisher.
1 Oil Can.
2 Screw-Drivers, Nos. 3 and 4.
2 Bodkins.

REDUCED.

POCKET TOOL=CASE.



Made of leather, lined with cotton velvet, and provided with a slip cap as shown; contains tools for taking apart and assembling hand-pieces, viz:

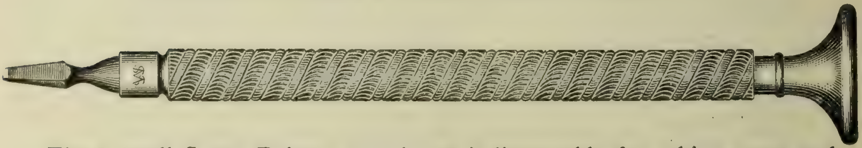
A monkey-wrench, two bodkins, and two screw-drivers, Nos. 1 and 2, with points respectively about $\frac{4}{64}$ and $\frac{6}{64}$ of an inch wide.

PRICES.

Complete as shown		$4.00
Wrench, separately		.75
Screw-drivers, Nos. 1 and 2, separately	each	.50
Bodkins, separately	"	.10

REDUCED.

SCREW=DRIVERS Nos. 1 and 2.



These small Screw-Drivers are almost indispensable for taking apart and putting together Hand-pieces. They are adapted in size of points to the slots of the small screws in our Hand-pieces, and not intended for work in the larger screws of the dental engine; they can only be used upon them at the risk of being broken and ruining the screw-head. On the other hand, larger Screw-Drivers are absolutely unfit to be applied to the small screws of Hand-pieces.

These Screw-Drivers are part of the equipment of the Pocket Tool-Case illustrated above.

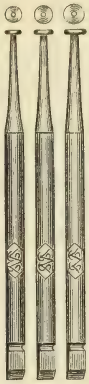
Made with two sizes of points, No. 1 about $\frac{4}{64}$ inch wide, and No. 2 about $\frac{6}{64}$ inch wide. The smaller is shown.

Knurled steel handle and revolving head, nickel-plated. Points of blued steel.

Price	each $0.50

Outfit for Cutting Cavities in Porcelain Teeth.

Actual size.



Actual sizes.

It is not uncommon for dentists to be asked to give artificial dentures a more lifelike appearance by inserting gold fillings in some of the porcelain teeth. Few dentists are equipped with appliances for cutting the necessary cavities, and consequently they have to send to the manufacturers, as a rule, if necessary to have them made.

The Cavity Cutting Outfit will make every dentist who uses it his own cavity-cutter, enabling him to cut just the sort of a cavity he wants.

The cutting material is a mixture of

CARBORUNDUM AND GLYCEROL,

which we have called by the trade-name of

CARBORINE.

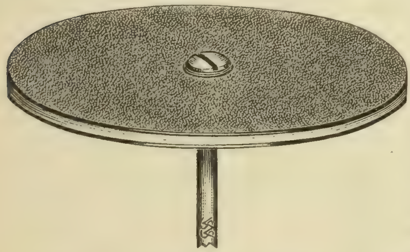
It is a reliable, effective cutter of the dense, hard porcelain, and carried on the soft steel heads of the instruments readily cuts the cavity. Three sizes of the instruments are supplied.

Price, Complete Outfit, as illustrated	$0.50
" Carborine, separately	.20
" Instruments, " ... each	.10

Directions for use printed on the label of the box.

In ordering state for which Hand-piece the instruments are desired.

HANDY INSTRUMENT SHARPENER.



A convenient appliance for quickly putting a keen edge on excavators, chisels, drills, etc. It is, in fact, a miniature emery wheel, adapted to the needs of the dental office. It consists of a metal disk, thick enough to form a rigid support, a paper disk to provide an abrasive surface, with a felt disk between to form a cushion or buffer, and the whole mounted on a Huey Mandrel. The disks are 2 inches in diameter.

With one of these sharpeners in the Engine equipment, an instrument can be put on edge in a moment, or ground or shaped to suit a special case.

Put up in a box, containing 100 Paper Disks, assorted (50 Emery, coarse, 25 Sand, each medium and fine), 2 Felt Disks, 1 Metal Disk.

Price, complete	per box	$0.25
" Extra Metal Disks	each	.05
" " Paper Disks	per hundred	.20
" " Felt Disks	each	.02

ADVANCED.

DIAMOND DISKS, WHEELS, POINTS, ETC.

Advance of over 100 per cent. (because of scarcity of supply) in the price of diamond splints and bortz used in the manufacture of disks, points, trephines, wheels, etc., compels an advance in our prices. We may be compelled to go still higher, as it is understood that there will be still further advances in the diamond market.

Diamond Disks, Drills, Wheels, and Points, when properly made and properly used, are the perfection of clean, sharp rapid-cutting devices for dentists' use. Ours are properly made, better than any others. Proper use means keeping them wet when in operation, and allowing them to "feed" themselves without being pushed.

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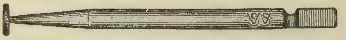
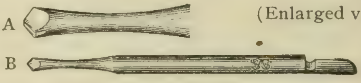


For removing the enamel surface as a starting point in drilling natural or artificial teeth. As it is charged all over, it will also be found excellent in smoothing cavity-margins and other uses.

Price ....each $0.90

DIAMOND DRILLS.



(Enlarged view of B.)

Diamond Drills are made with fragments or splints of diamonds left from the cutting of gems, mounted in a steel mandrel, and held by the compression of the steel with the aid of solder. The value and durability of the Drills depend upon the care with which this setting is made. We purchase the best selected splints that can be obtained, and mount them in our own factory. The result is that we can *guarantee the workmanship* of every Drill, and can safely say that they are not surpassed by any Diamond Drills in the market. We must, however, repeat the caution that we have always given with regard to these instruments. From the necessary method of manufacture it is evident that rough, hasty, or careless use is very likely to tear the diamond from its fastening, and of course destroy the Drill. We test every Drill before it is placed on sale, but cannot recommend or guarantee it for careless or indiscriminate use. We invite a careful comparison of our product with any Drills that are offered elsewhere.

Fig. A is an enlarged view of the Drill, showing the cutting-edge of the diamond. Fig. B is a Drill of the usual size.

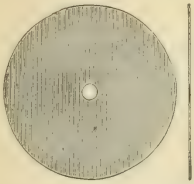
Price ....each $1.50

In ordering Engine Instruments, always specify Hand=piece for which they are desired.

DIAMOND DISKS.

Regular.—Charged all over. The regular are always sent unless Thin or Safe-Side are specified. Two sizes: No. 1, ¾-inch; No. 2, ⅞-inch.

Thin.—Charged all over. Same sizes as the regular.



These [Thin] Disks are so thin that when the strain of the work is put upon them the mandrel is liable to tear out the center. To avoid this liability we supply with each disk two washers, which should be placed upon either side of it when mounting on the mandrel.

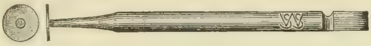
Price of either Regular or Thin......each $3.25

Safe-Side.—Charged on one side only, the other made smooth or "safe," thus doing away with the need of a shield. Two sizes: No. 1, ¾-inch; No. 2, ⅞-inch.

Price ....each $2.00

Fissure.—Will cut on both sides the same as the "Regular" Disks. They are made $\frac{5}{16}$-inch in diameter. The center holes are made sufficiently large to admit the screws of Mandrels Nos. 303 and 313. They can also be used on Mandrels Nos. 304 and 314 by properly centering the Disk before tightening the screw.

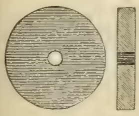
Price ....each $1.00



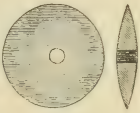
Small Fissure.—Diameter $\frac{3}{16}$-inch. Charged all over. Permanently mounted, not sold unmounted.

Price ....each $0.75

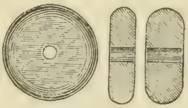
DIAMOND WHEELS.



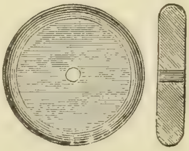
No. 1.
Square Edge.



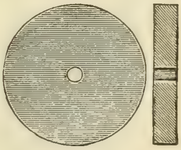
No. 2.
Knife Edge.



Nos. 3 and 4.
Round Edge.



No. 5.
Round Edge.



No. 6.
Square Edge.

The value of Diamond Wheels in heavy work, as the dressing of roots, is well known. Made in six sizes and forms. Nos. 1 and 2 are charged all over; Nos. 3, 4, 5, and 6 on the edge only, with smooth sides.

Can be used on Mandrels Nos. 302, 303, 313, 317, 319 A.

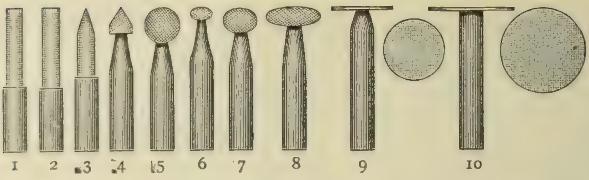
PRICES.

No. 1,	Square Edge,	½-inch diameter		each	$2.00
“ 2,	Knife “	“ “ “		“	2.00
“ 3,	Round “	“ “ “	Thin	“	2.00
“ 4,	“ “	“ “ “	Thick	“	2.25
“ 5,	“ “	¾ “ “		“	3.00
“ 6,	Square “	“ “ “		“	3.00

In ordering Engine Instruments, always specify Hand-piece for which they are desired.

ADVANCED.

DIAMOND POINTS.



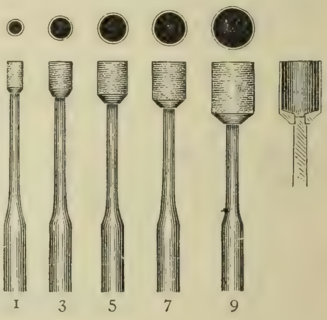
The forms of these Diamond Points were selected specially for their applicability to the needs of crown- and bridge-workers, to whom they will be invaluable. The Points are charged all over. Used with Porte-Polisher No. 307.

PRICES.

Nos. 1, 2, 3, 4, 5, 6, 7	each	$0.80
" 8 and 9	"	1.25
No. 10	"	1.75

Diamond Trephines for Porcelain Inlaying.

Devised by Geo. H. Weagant, L.D.S.

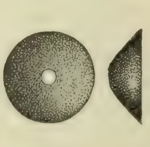


In many cases of inlaying, the inlay, in order to match the natural tooth perfectly, must be of a different shade in one portion from another. This is solved by carefully matching the natural tooth with one of porcelain, and then cutting the inlay from the portion of the latter corresponding to the location of the cavity. These Trephines were devised to facilitate this operation. They are made of copper, charged with diamond, exactly like the well-known diamond disks. Five sizes are made, corresponding with sizes 1, 3, 5, 7, and 9, of the set of Inlay Burs, which are used to prepare the cavity.

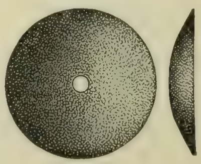
PRICES.

Nos. 1, 3, and 5	each	$0.90
" 7 and 9	"	1.40

DIAMOND CUPS.



No. 1.



No. 2.

The Diamond Cups are of the same quality, and are guaranteed to give the same satisfaction as our other Diamond Instruments.

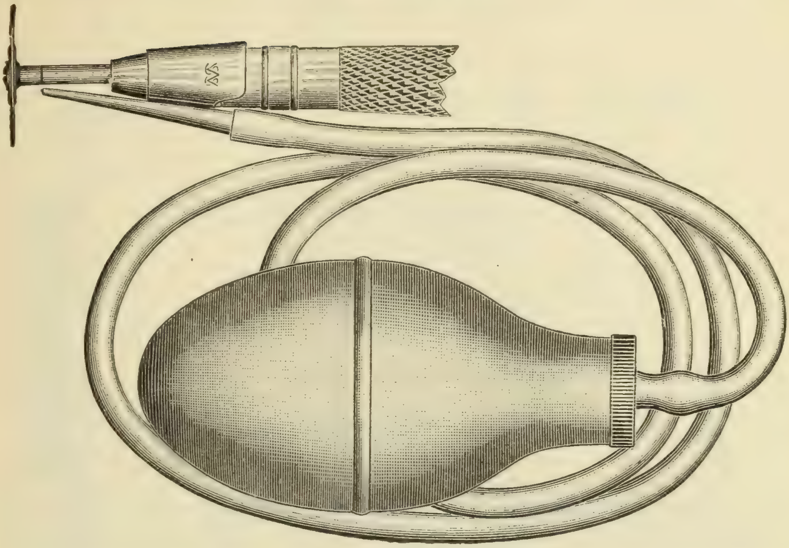
The cases to which this form is specially adapted are familiar to every dentist.

Like all diamond instruments, they should be run wet, and with moderate pressure.

PRICES.

No. 1, ½-in. diameter	$2.25
" 2, ¾-in. "	2.75

DISK MOISTENER.



This appliance, devised by Dr. C. E. Edwards, has a split sleeve to fit over the hand-piece nose, and carries a little pipe connected by a rubber tube with a rubber bulb which may be held in the palm of the hand with the hand-piece.

The bulb being filled with water, a fine stream may be thrown upon Corundum Disks and Points, and it is especially needed when using Diamond Disks, Drills, etc., as these are quickly spoiled by running dry.

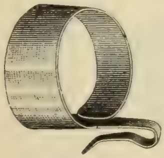
This instrument is an excellent chip blower, using air instead of water.

The split sleeve permits it to be used on Hand-pieces Nos. 4, 6, 7, and 8.

Price $1.00

IMPROVED FINGER SPONGE=HOLDER.

Devised by Dr. Gordon White.



An adjustable finger-ring carries a little hook for catching in and holding a bit of sponge, which can readily be detached when foul and replaced by a fresh piece. The ring being adjustable, will fit any finger. In dressing down a root it is placed on the forefinger of the left hand; in grinding a crown or polishing bridge-work, it may be worn on the middle finger of the same hand. It will be found a convenience.

Price $0.40

GOLD NERVE BRISTLES AND PULP-CANAL CLEANSERS.

Patented July 14, 1885.

Made by Dr. R. B. Donaldson.

Nerve Bristles.

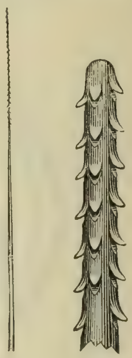
MARQUE DE FABRIQUE
Muster DONALDSON Schutz
Déposée en France.
Geschützt im Deutschen Reich.

TOUGH, SPRINGY.

WILL NOT CORRODE.

READILY STERILIZED.

Pulp-Canal Cleansers.



These instruments are like the well-known steel Bristles and Cleansers except in the material of which they are composed. The new instruments are made of 18K. spring gold, and have all the advantages of that material. They are tough, springy, and will follow the canal as readily as a steel broach, —perhaps more so. They are very little likely to break in use, they do the work of cleaning or medicating the canals effectually, they will not corrode, and they may be sterilized by boiling in water without risk of rust.

The Gold Nerve Bristles are only made in the plain form (without hook). The Gold Pulp-Canal Cleansers are cut in the same way as those of steel, the barbs forming a broken screw thread, permitting them to be readily withdrawn from the canal when desired.

Both Bristles and Cleansers are 1¾ inches long, and they can be used in the Donaldson vulcanite handle or in the usual nerve-broach holders.

The Gold Nerve Bristles are made of three diameters,—fine, medium, and large,—without handles, and put up in packages of 6, either fine, medium, or large, but not assorted.

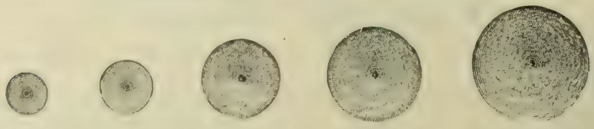
The Gold Pulp-Canal Cleansers are made of three diameters,—fine, medium, and large,—without handles, and put up in packages of 6, assorted and fine.

PRICES.

18K. Spring Gold Nerve Bristles......	per package	$3.25;	each $0.55
" " " Pulp-Canal Cleansers	"	3.50;	" .60

LEATHER POLISHING WHEELS.

Sometimes designated as Moosehide or Hard Buff Polishers.



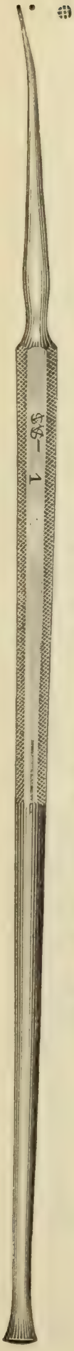
Nos.	0	½	1	2	3
Diameters,	$\frac{3}{16}$ in.	¼ in.	⅜ in.	½ in.	⅝ in.

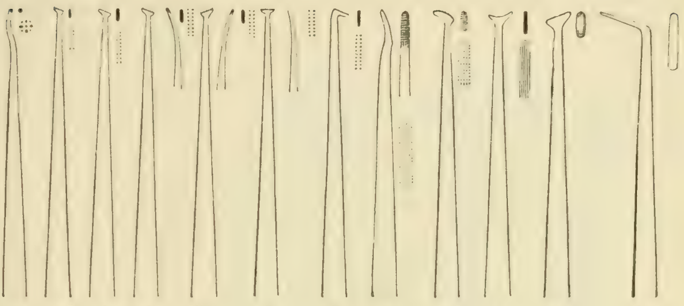
For carrying pumice and other powders to clean teeth or polish fillings. Five diameters, varying in thickness.

Put up in boxes of 100 assorted or of separate diameters, as desired. Used on Mandrels Nos. 301, 301¼, 319 B.

Price ....per box $0.40

CHAPPELL'S GOLD BUILDERS.





This set of fine Mallet Pluggers is strongly individualized throughout, not merely in the general principle, but in the special carrying out of the principle shown in each of the points. The serrations are cut on as fine lines as those of the Varney points, but the two sets are in no way alike, except in number.

One marked peculiarity is the angle of the valley cut of the serrations. Dr. Chappell says of this peculiarity, that "the interdigitations made by the serrations will range as seats in an amphitheater, and the shape of these steps firmly secures the metal in place, until the welding force is applied to the instrument, when the metal becomes a solid mass by cohesive force, free from 'seams' or 'balling up.'"

Herein is the origin of the name "Gold Builders."

The forms of the points are unique. They are mostly of the foot-shape or variations of this form, the insteps being cut away to permit of delicacy and precision of manipulation at all stages of the operation.

In the Long Handle, every alternate face of the octagon shaft is file-cut, the intermediate faces smooth.

Used with cohesive gold. Dr. Chappell prefers No. 30 rolled cohesive gold, cut in strips 1-16, 1-8, 3-16 in. wide, and 1 in. long, reannealing as used.

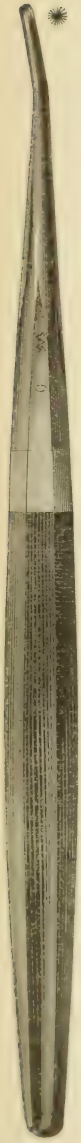
Nos. 11 and 12 of this set are designed for convex and concave contour building and surface finishing for No. 13, which is a smooth planisher.

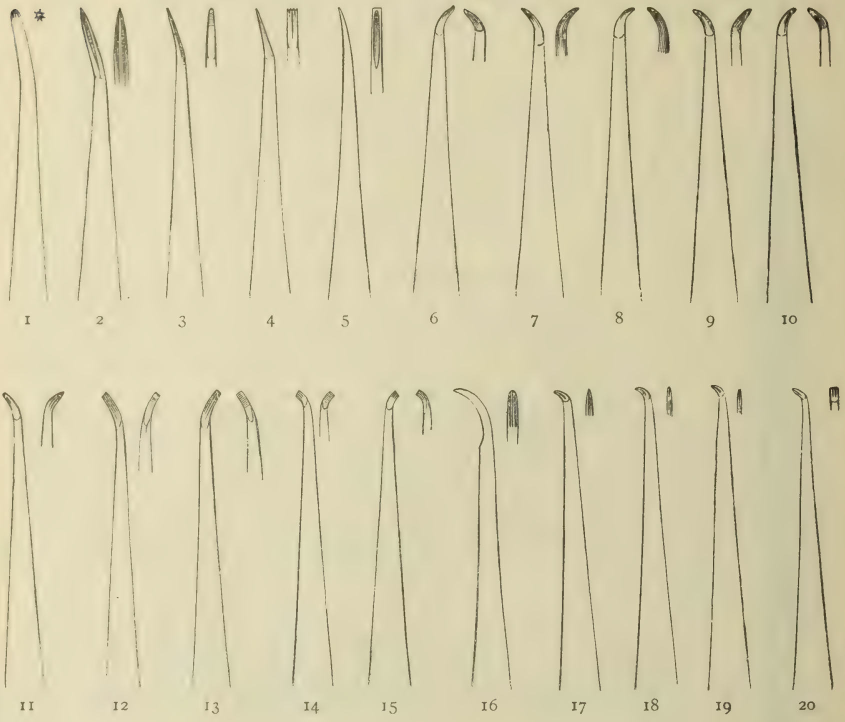
PRICES.

		Long Handle.	Cone-Socket Points.
Per set of 13		$17.50	$14.25
SEPARATELY.			
Nos. 1, 2	each	$1.00	$0.75
" 3 to 8	"	1.50	1.25
" 9	"	1.75	1.50
" 10	"	2.00	1.75
" 11	"	1.75	1.50
" 12, 13	"	.60	.35
Morocco Case for complete set, with space for each instrument		3.00	

DR. B. J. BING'S

SET OF SOFT GOLD OR TAPE PLUGGERS.





For filling with soft gold in the form of tape. They are distinctive in their characteristics, and have nothing in common with our ordinary serrated points, being instead fillers, packers, and condensers, with points, sides, ends, and corrugations carefully designed to accomplish these modes of inserting the gold.

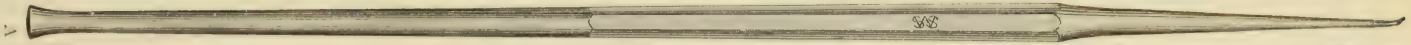
For their own special uses they are unique and superior to any other set, and they have been found useful in other directions. An extremely popular set with those who practice filling with tape gold.

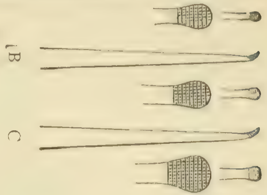
Made only on taper ebony handles, graded to correspond with the size and use of point.

PRICES.

Per set of 21		$18.50
SEPARATELY.		
No. 0	each	$1.25
Nos. 1, 2, 16	"	1.00
" 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	"	.90
" 3, 5, 17, 18, 19, 20	"	.75

NICKLIN MODIFICATION PLUGGERS.



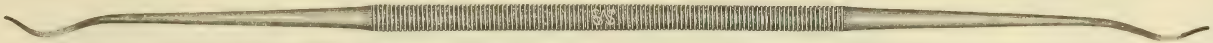


These three Pluggers are modified forms of the well-known No. 16 of Butler's mallet set. They have the Varney style of handle. The modifications in sizes and serrations were suggested by Dr. T. L. Nicklin.

Price, Steel Handles...each $1.50
" Cone-Socket Points ...." 1.25

DOUBLE-END PLUGGING ASSISTANT.

Pattern furnished by Dr. H. Weston.



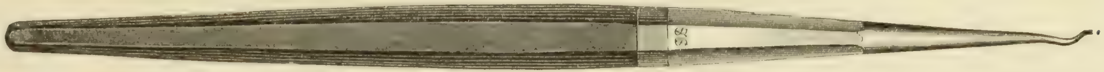
The peculiarity and merit of this Double-End Assistant lies in very ingenious curves of the ends, which on reversal will lean to opposite sides, and so hold a pellet without interfering with the Plugger or obstructing the sight. Made only on Round Steel Handles.

Price $0.60

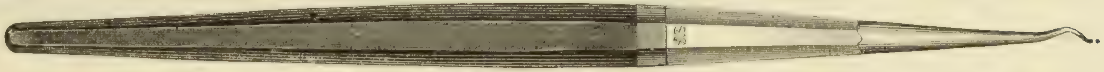
Not made for Cone-Socket Handles.

WEBB'S RIGHT AND LEFT EBONY HANDLE PLUGGERS.

No. 1.



No. 2.



Made only on Ebony Taper Handles, with Corkscrew Right and Left points, as illustrated in Webb's "Notes on Operative Dentistry," p. 48.

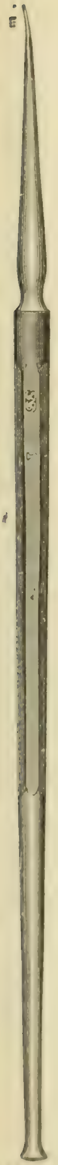
Price...each $0.75

Not kept in stock for Cone-Socket Handles.

Fine Pluggers for the Electric Mallet.

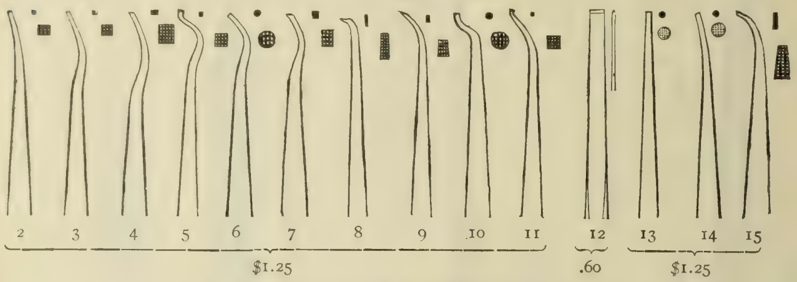
The Pluggers in this list are all finely serrated. Nos. 1 to 15 are the set devised by Dr. Marshall H. Webb, containing all the original points and those added at subsequent revisions by himself and Dr. C. S. Wardwell. Following these are the well-known instruments of Drs. Knowles, Varney, Nicklin, and Chappell, and additional forms by Dr. T. S. Waters, Dr. E. Parmly Brown, and Dr. H. J. McKellops.

Nickel-plated handles.

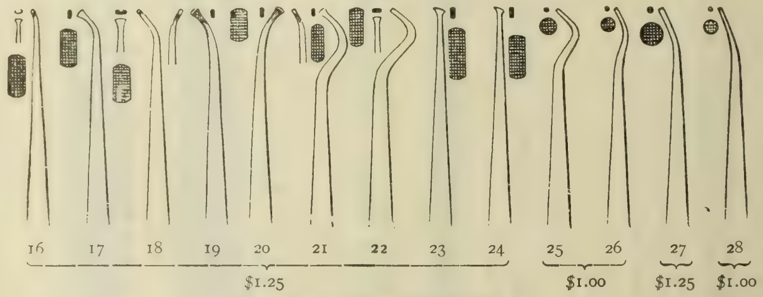


No. 1.
$1.25.

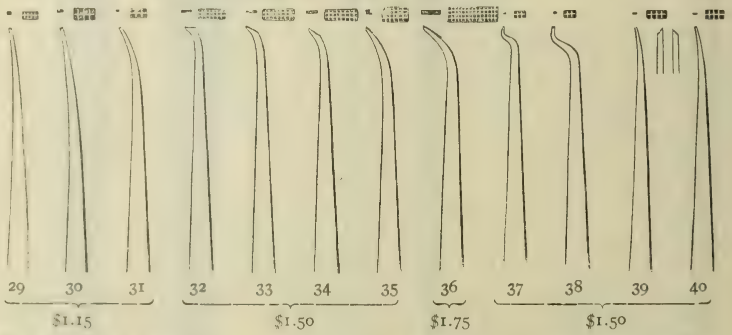
DR. M. H. WEBB'S SET.



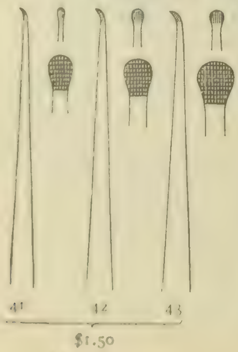
DR. S. E. KNOWLES'S "CLUB FOOT" SET.



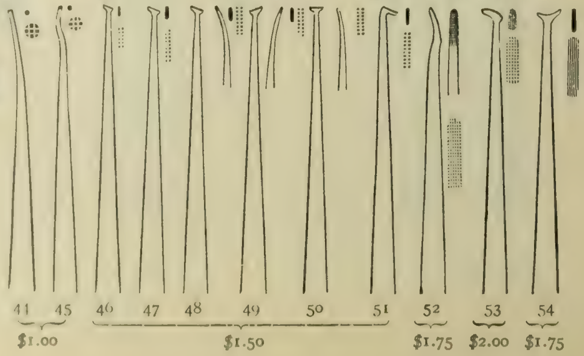
DR. R. W. VARNEY'S SET.



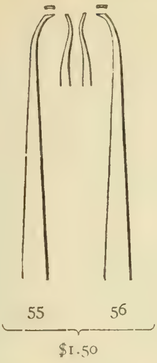
Dr. T. L. Nicklin's Set.



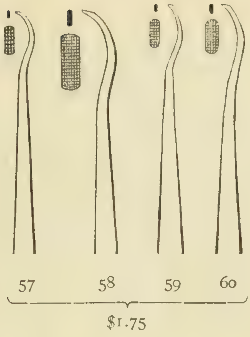
DR. M. H. CHAPPELL'S "GOLD BUILDERS."



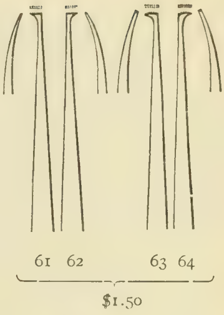
Dr. T. S. Waters's.

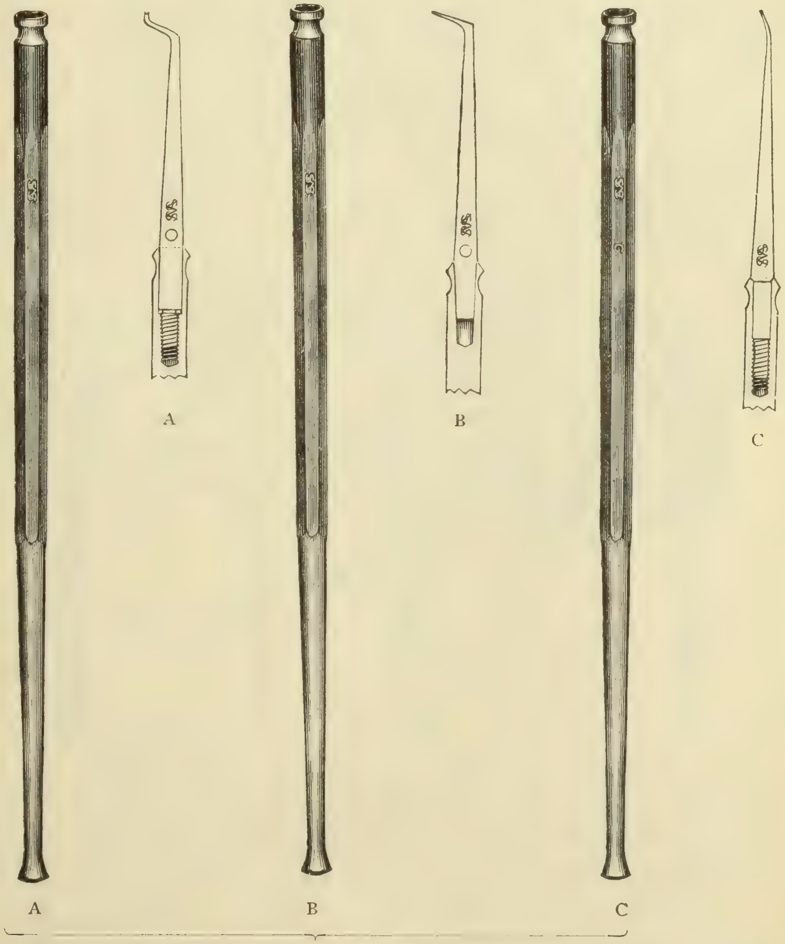


Dr. E. Parmly Brown's.



Dr. H. J. McKellops's.

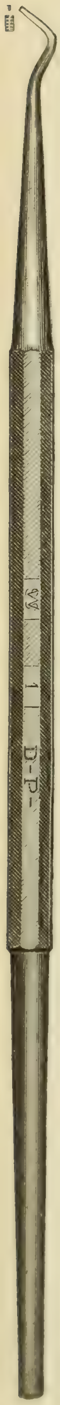


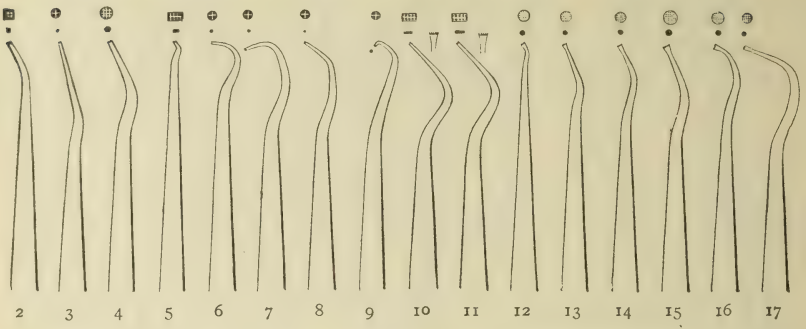


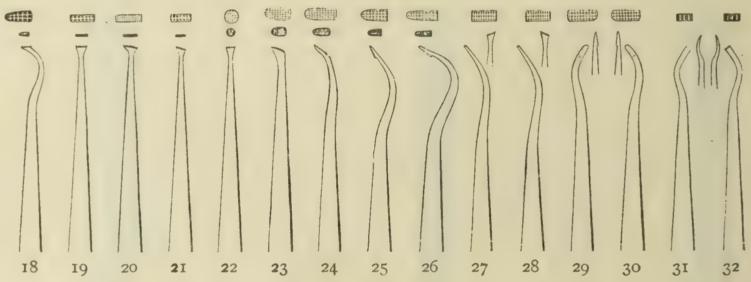
SOCKET HANDLES.

"A," Socket for Snow & Lewis Plugger-Points
"B," " " Salmon "
"C," " " Cone-Socket " } ....each $0.75

THE DARBY-PERRY PLUGGERS.



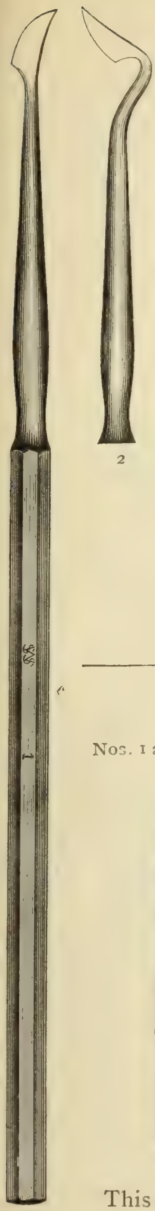




The thirty-two Pluggers here illustrated, and the Darby-Perry Scalers, are the result of a joint comparison and selection by Drs. Edwin T. Darby and Safford G. Perry, and which are essential to their methods of operating, and are the only authentic Darby-Perry selections now offered for sale. A careful inspection of the illustrations will show the delicacy and nice adaptation of the points. They are of the same quality and finish as our standard goods.

PRICES.

		File-cut Taper Handles.	Cone-Socket Points.
Per set of 32		$23.00	$15.00
SEPARATELY.			
Nos. 1, 2, 3	each	$0.60	$0.35
" 4	"	.75	.50
" 5 to 11	"	.60	.35
" 12 to 18	"	.75	.50
" 19	"	.60	.35
" 20	"	1.00	.75
" 21, 22	"	.75	.50
" 23 to 26	"	1.00	.75
" 27 to 30	"	.75	.50
" 31, 32	"	.60	.35



GOLD TRIMMERS.

Design by Dr. Frank D. Gardiner.

With these two Gold Trimmers the dentist is fully equipped for trimming off gold fillings in whatever position.

The No. 1 is a modification of an old form, which has now been worked up into an instrument of the highest efficiency. Its place is in trimming or shaving gold from the cervical margins of all fillings, and in removing nearly all excess of gold from labial and buccal fillings. Where the clamp is used and the cavity margin barely clears the clamp, the gold can be easily, quickly, and thoroughly removed with this instrument.

There are positions not readily accessible to the No. 1, as in trimming from the palatal and lingual surfaces, so the No. 2 has been devised to complete the range of work. It has been in actual test for some time in Dr. Gardiner's office, and he pronounces it satisfactory.

These instruments are very sharp as sold. The manner of their use requires that they be kept sharp.

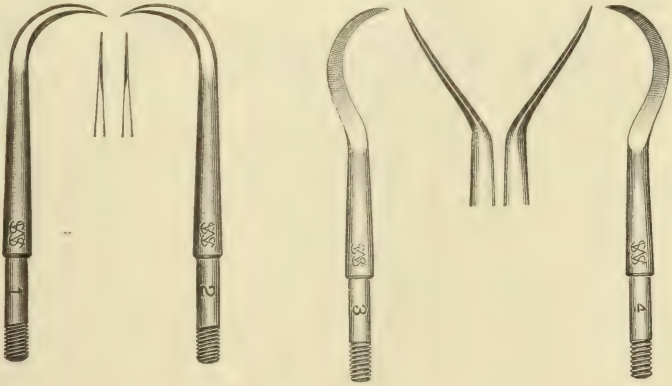
The only caution is not to use them on gold which is not thoroughly welded.

Price ....each $0.50

Made in Octagon Steel Handles only.

APPROXIMAL TRIMMERS.

Nos. 1 and 2 designed by Dr. Gordon White; Nos. 3 and 4 by Dr. E. K. Wedelstaedt.



This set of four Approximal Trimmers covers a good deal of territory in the trimming of approximal fillings, more especially at the cervical margins.

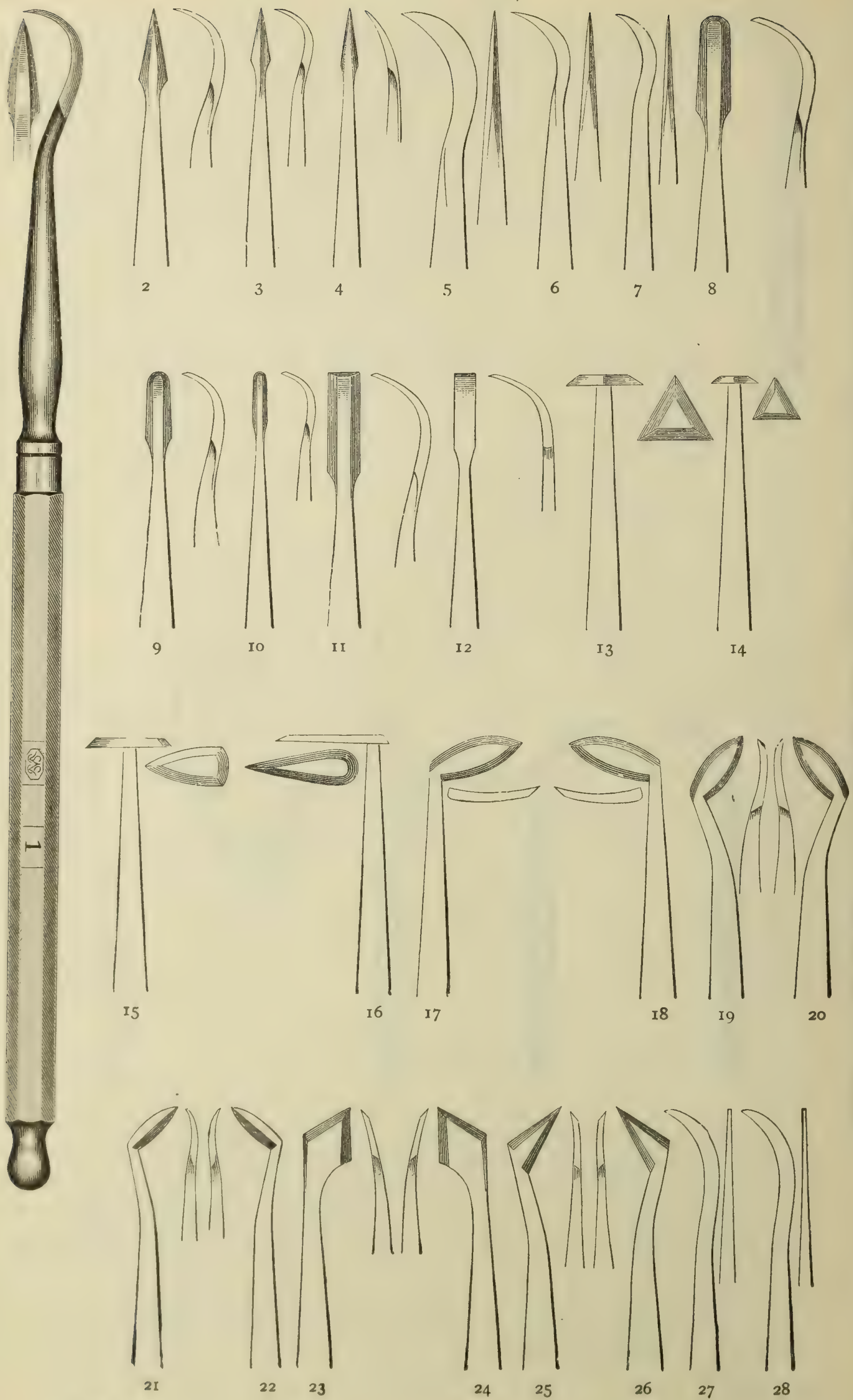
Nos. 1 and 2 are of the ordinary full curve, with both convex and concave surfaces sharpened, so that they are adapted to either the push or pull cut. Useful also for trimming the approximal sides of roots preparatory for crowns.

Nos. 3 and 4, in addition to the sickle curve, have a lateral bend, adapting them readily to trim mesial or distal fillings in molars and bicuspids.

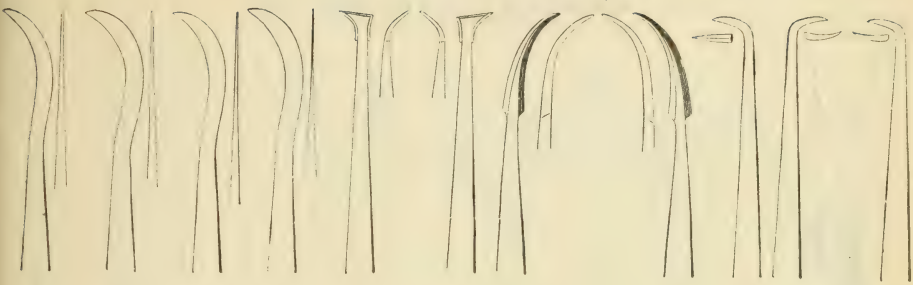
Made for Cone-Socket Handles.

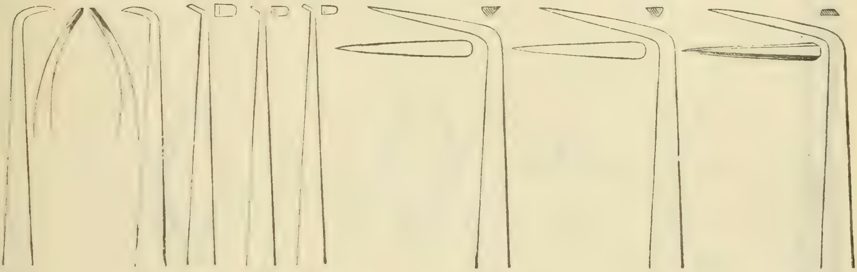
Price ....each $0.35

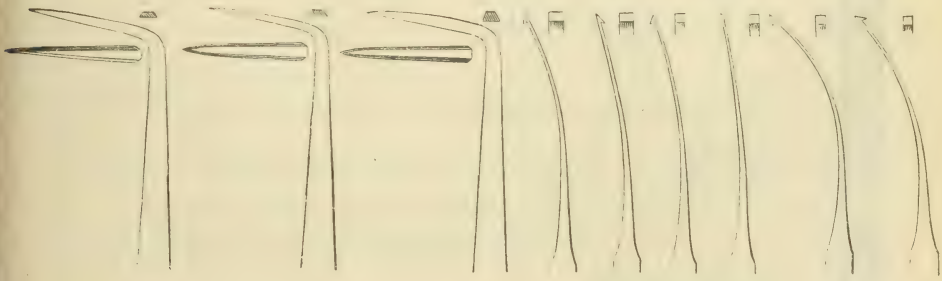
SCALERS.

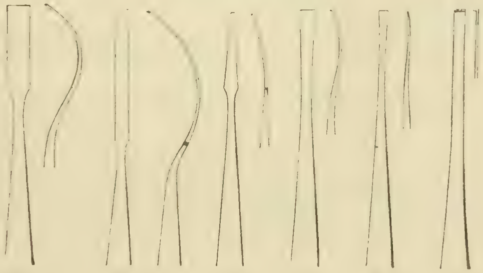


SCALERS.







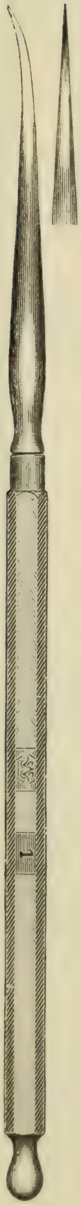


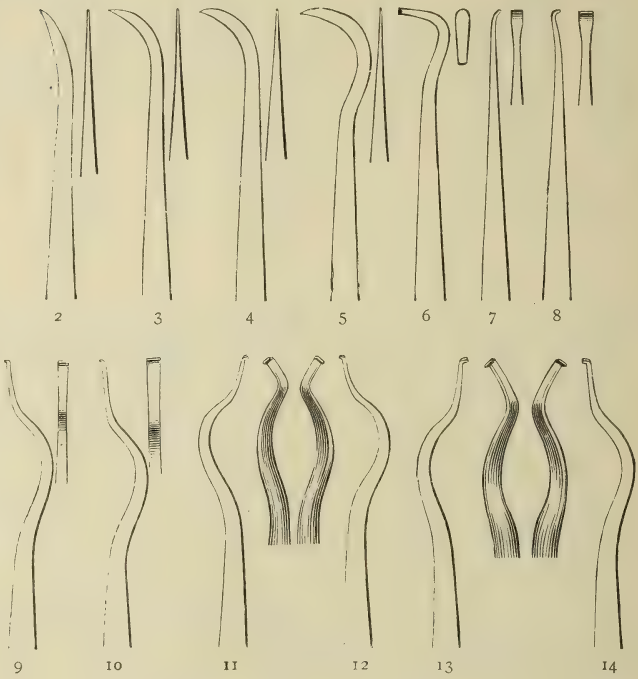
PRICES.

File-cut Handles	each $0.50
Cone-Socket Points	" .35

DR. F. ABBOTT'S SET OF SCALERS.

For Removing Calcular Deposits.





These Scalers are so shaped as to cut either forward, backward, or laterally.

The following description will indicate their special adaptation, but they will be found very useful for a large variety of cases:

Nos. 1, 2. For removing calcular deposits from between the lower front teeth anteriorly.

Nos. 3, 4, 5. For the same teeth posteriorly; also around the necks of all teeth, both upper and lower.

No. 6. For the extreme lingual portion of lower incisors and cuspids.

No. 7. For any tooth, *under the gum*, to which its shape is adaptable.

No. 8. For any of the upper front teeth, *under the gum.*

Nos. 9 and 10. For lingual portions of lower front teeth, *under the gum.*

Nos. 11, 12, 13, 14, are Rights and Lefts, for cleaning *under the gums* of lower back teeth.

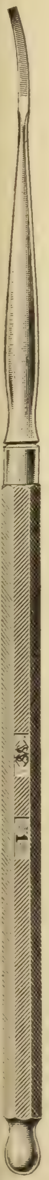
PRICE.

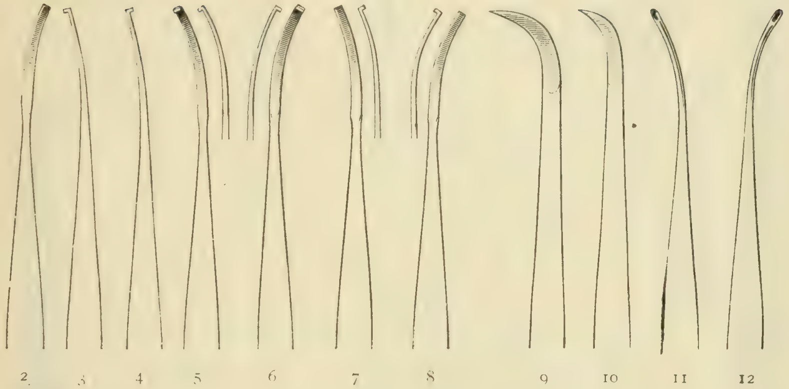
File-cut Handles ....each	$0.50

Made in Long Handles only.

SCALERS.

Devised by Dr. A. W. Harlan.





These are of the class known as "fine" scalers, intended for the removal of fine deposits located between the teeth or upon the roots. They are not in any case to be used upon the heavy, dense salivary deposits which sometimes encrust the teeth. For the finer, more delicate operations for which they were designed, they will be found indispensable.

Dr. Harlan supplies this description:

"They should be used with a delicate push and pull movement.

"Nos. 1 and 2 are right and left push Scalers, Nos. 3 and 4 are delicate reverse or pull instruments.

"Nos. 5, 6, 7, and 8 are right and left direct and reverse pull Scalers.

"These are especially useful where Nos. 3 and 4 will not reach.

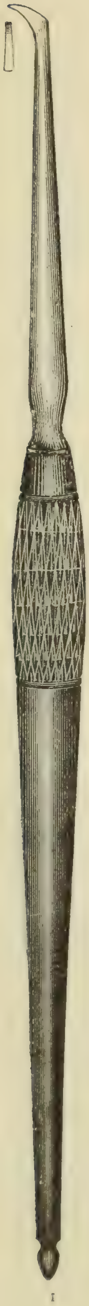
"Nos. 9 and 10 are sickles, to be used between the teeth; they may be used with a push or pull movement.

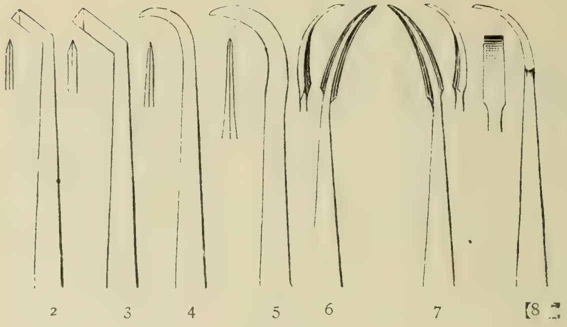
"Nos. 11 and 12 are delicate spoon pushing Scalers, for removing fine deposits from the bifurcations and otherwise inaccessible localities."

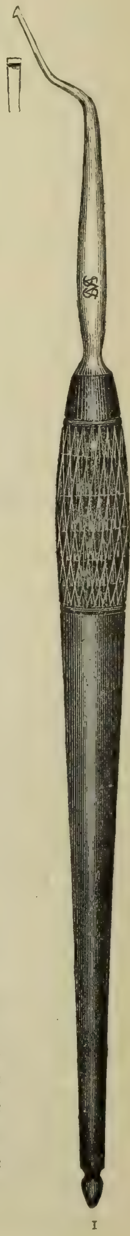
Made in Long Handles only.

Price	each	$0.50
"	per set	6.00

S. S. WHITE'S SMALL SCALERS.







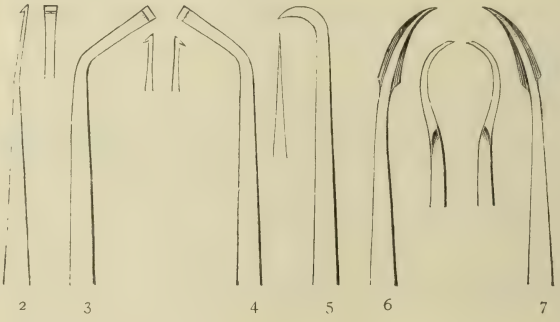
PRICE.

Ebony Taper Handles, Finger-hold Checkered ....each $0.50

Made in Long Handles only.

KING'S SCALERS.

Devised by Dr. S. H. King.



By judicious modifications of the curves, weights, and sizes of well-known Scaler forms, Dr. King has grouped together an effective set of instruments, whose good qualities and general availability will commend them to experienced operators. They are sufficiently thin to pass between the gum and the tooth without laceration, and have at the same time sufficient rigidity to do the work required of them. All the instruments are intended to be used with the draw-cut.

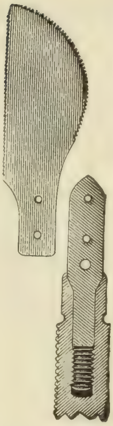
PRICE.

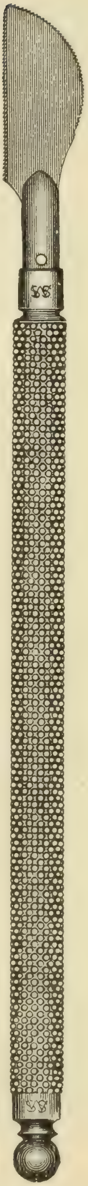
Ebony Taper Handles, Finger-hold Checkered...........each $0.50

Made in Long Handles only.

SEPARATING SAWS.

Pattern furnished by DR. GORDON WHITE.

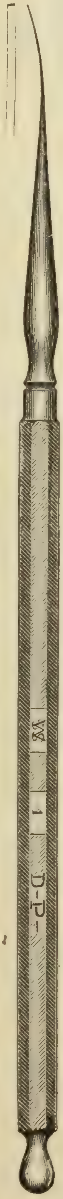




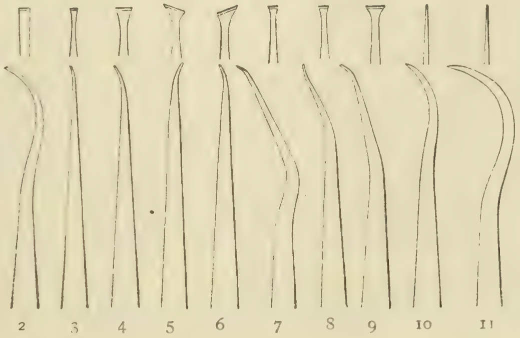
The straight and curved edges of this Saw enable the operator to make separations between the teeth preparatory to the use of disk or strip, without risk of wounding the gum, as it permits very delicate manipulation. The holder for the Saw is made to fit our Cone-Socket Handles, of which Nos. 3, 5, 8, and 10 A are suited to carry it.

PRICES.

Complete as shown, with No. 3 Handle......		$0.75
Saws	each	.25
Holder	"	.35
Handle	"	.15



DARBY-PERRY SCALERS.



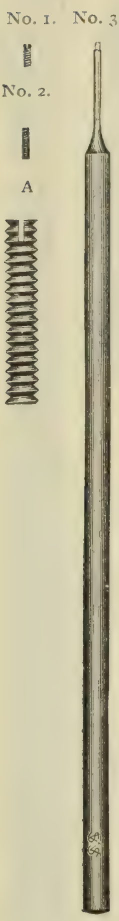
PRICES.

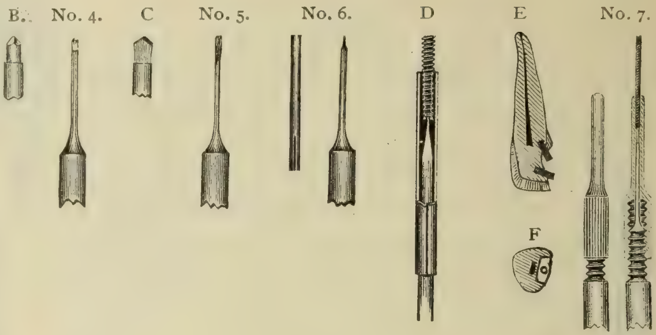
	File-Cut Ball-end Handles.	Cone-Socket Points.
Per Set of 11..................	$6.25	$3.50

SEPARATELY.

Nos. 1 to 3................each	$0.50	$0.25
" 4 to 11.............. "	.60	.35

ANCHOR SCREWS AND APPLIANCES.





Cut No. 1 shows the size of the 18-carat Gold Anchor Screw.

No. 2. Iridio-Platinum Anchor Screw, same diameter, but longer than No. 1.

"A." Anchor Screw magnified to show thread and slot. Also sold in 2-inch lengths. See Nos. 9 and 10, page 23.

No. 3. The Starting or Center Drill will form a pit at the exact point desired; but if this point be not at first obtained the pit center may be moved laterally while the drill is revolving.

"B." Point of Center Drill magnified.

No. 4. Limit or Anchor Drill; will bore only to the depth determined by the limit shoulder,—half the length of Screw No. 1.

"C." Point of Limit or Anchor Drill magnified.

No. 5. Screw-Tap; is probably the most perfectly formed tap of its size that has ever been put on the market, its diameter being only thirty one-thousandths (.030) of an inch.

No. 6. Screw-Driver and Sleeve which holds the screw for insertion or removal, as shown magnified at D.

No. 7. The Anchor Screw Chuck is made upon the principle of the How Screw-Post Chuck, and is operated in the same way. It will drive an Anchor Screw or a section of Anchor Screw Wire, but it cannot be used to back out a slotted screw as the Driver No. 6 can. Its principal use is in screwing home sections of the wire, which may be nicked at the proper point, and twisted off by turning the chuck after the wire is seated, leaving the cut-off end as an anchor.

"E" and "F" exemplify the Anchor Screw in gold contouring operations. A drilled and tapped hole to be filled with gold foil serves as a superior retaining point.

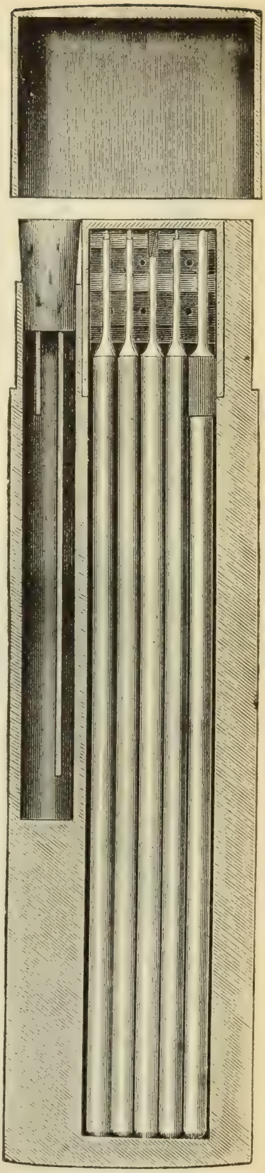
The handles are made smooth to prevent a breaking twist or the stripping of the threads of dentin by excessive force in turning the tap.

PRICES.

No. 1.	Gold Anchor Screws	each	$0.20
" 2.	Iridio-Platinum Anchor Screws	"	.25
" 3.	Center Drill	"	.25
" 4.	Anchor Drill	"	.25
" 5.	Anchor Tap	"	.50
" 6.	Anchor Screw-Driver and Sleeve	"	.30
" 7.	Anchor Screw Chuck	"	1.00
	The set of five instruments (Nos. 3 to 7)	per set	2.25
	Center Drill No. 3 and Anchor Drill No. 4 are also made for use with engine. Price	each	.25

In ordering, state for which Hand-piece they are desired.

Case for Anchor Screw Appliances.



The instruments are held in a narrow compartment, at the upper end of which (under the points of the instruments) is a recess for holding the little boxes in which slotted Anchor Screws are sold. One of these with the lid removed is set into the recess. A cylindrical compartment is provided for carrying lengths of Anchor Screw-wire, with a cork stopper, which not only keeps dust out but supplies a ready method of handling the wires.

Made of wood (size of cut), leather-covered, with slip-top.

PRICE.

Case	$0.50
Complete, including set of 5 Screw Appliances, 6 Gold Screws No. 1, 2 inches Gold Anchor Screw Wire, and Case	4.90

SCREW-WIRE POSTS, ETC.

SCREW-WIRE.

	No.	Length.	Diam.	Threads to inch.	Price per rod.
Morrison's 12-K. Gold	1	3 in.	.052	112	$1.50
“ “ “	2	3 “	.042		1.20
“ “ “	3	3 “	.035		1.00
Talbot's 18-K. “	4	2 “	.060	54	1.50
“ “ “	5	2 “	.058		1.50
“ “ “	6	2 “	.051		1.00
“ “ “	7	2 “	.046		1.00
“ “ “	8	2 “	.041		1.00
Anchor “ “	9	2 “	.030	100	1.00
“ Iridio-Platinum	10	2 “	.030		1.25

SCREW-POSTS.

	No.	Length.	Diam.	Threads to inch.	Price each.
How's 14-K. Gold	AA	⅞ in.	.051	48	$0.45
“ “ “	A		.058		.55
“ “ “	B		.065		.65
“ Bright-Metal	AA	⅞ “	.051		.15
“ “ “	A		.058		.15
“ “ “	B		.065		.15
“ Crown Metal	AA	⅝ “	.051		.50
“ “ “	A		.058		.60
“ “ “	B		.065		.70

SCREW-POSTS WITH HEADS.

		Length.	Diam.	Threads to inch.	Price each.
Bright-Metal	AA	⅝ in.	.051	48	$0.35
“ “	A		.058		.35
“ “	B		.065		.35

ANCHOR SCREWS.*

Gold	$\frac{1}{10}$ in.	.030	100	.20
Iridio-Platinum	$\frac{3}{20}$ “	.030		.25

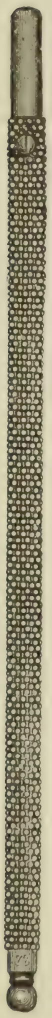
NUTS FOR SCREW-POSTS.

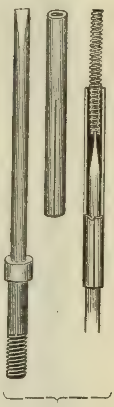
Gold, three sizes, AA, A, B	each	.50
Bright-Metal, three sizes, AA, A, B	“	.12

The Morrison Screw Wires are used with the taps and drills of the instruments known as the St. Louis system.

*Anchor Screws, both Gold and Iridio-Platinum, are put up in boxes of 6 screws each.

Appliances for Mounting Tooth=Crowns.





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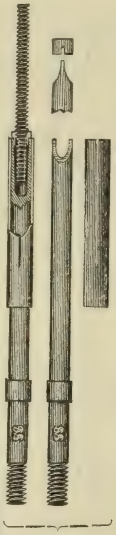

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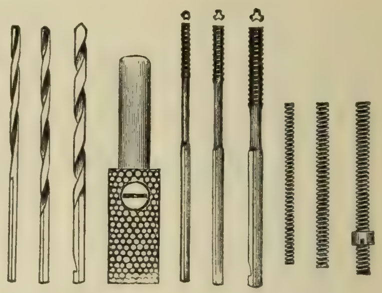
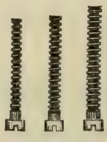


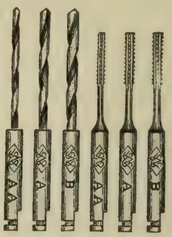
4AA 4A 4B 5 6AA 6A 6B 7AA 7A 7B
(7B with Nut.)

FIG. 1.



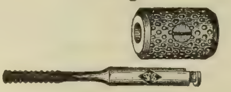
AA A B
Screw=Posts with Heads.

FIG. 2.

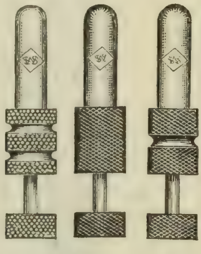


Right=Angle Drills and Taps.

FIG. 3.



Hub for Right=Angle Taps.



8AA 8A 8B

By means of these appliances, very firm attachments—*e.g.*, screws and nuts or headed screws or simple screw-posts—may be employed for crowns with a strong sense of security in the mountings, because of the accuracy with which they are gauged. With Nos. 2, 4, 6, and 7 a reliable anchorage for large fillings may be obtained; while the hub, with the right-angle drills and taps, provide for the fixing of retaining-screws in molar cavities and roots hitherto deemed inaccessible to such anchors. The screw-posts are usually cut off after insertion, but short pieces may be inserted with No. 8, or slotted with a separating file and turned in with No. 2.

PRICES.

No.	1.	Long-Handled Chuck, with set-screw for carrying the drills and taps	each	$0.75
"	2.	Cone-Socket Screw-Driver, with sliding split tube or gauge which serves as an adjustable holder for the screw-post	"	.50
"	3.	Nut-Driver, with Split Tube for Cone-Socket Handle, 3 sizes for Screw-Posts with Nuts	"	.50
"	4.	Twist Drills, 3 sizes	"	.20
"	5.	Drill Chuck with Set-Screw	"	.50
"	6.	Screw-Taps, 3 sizes	"	.50
"	7.	Screw-Posts	"	.15
"	8.	Screw-Post Chucks, 3 sizes	"	1.50
Fig.	1.	Screw-Posts with Heads	"	.35
"	2.	Right-Angle Drills, 3 sizes, AA, A, and B	"	.30
"	2.	" Taps, 3 " AA, A, " B	"	.50
"	3.	Hub for Right-Angle Taps	"	.20

Weston's Insoluble Cement.

Facts are stubborn things. They can't be argued out of existence. You can hide them; you can close your eyes to their existence, but they have to be reckoned with, all the same. Theories which don't fit in with the facts must be abandoned. It is a fact that Weston's Insoluble Cement, after more than twenty-one years' continuous large use by dentists, increases from year to year in the amount of its sales. You can theorize over this fact all you care to, but any theory which doesn't admit that Weston's Insoluble is a good cement, one which serves its purpose well, will have to be abandoned.

Put up in three forms:

One-Color Case,—Regular Gray Color, suitable for general use.

Two-Color Case,—Gray and Yellow, the two most commonly used shades, in large quantity.

Four-Color Case,—White, Yellow, Blue, Brown,—a companion to the One- or Two-Color Case to give variety of shades to meet all needs.

We ask special attention to the Two-Color Case, illustrated actual size.

WESTON'S
INSOLUBLE CEMENT.
Trade Mark
Two color case Gray and Yellow.
THE S S WHITE DENTAL MFG. CO.
GRAY.
YELLOW

TWO-COLOR CASE.

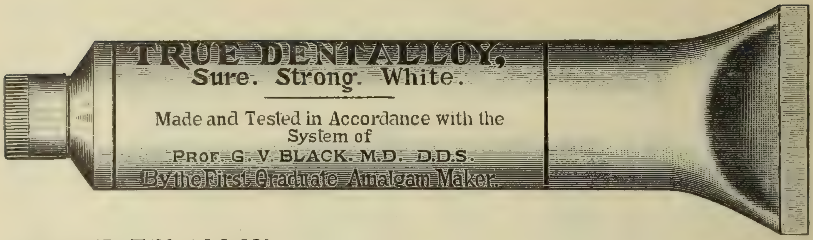
Actual Size.

PRICES.

One-Color Case	each	$0.50
" "	lot of 10 cases	4.50
Two-Color Case	each	.75
" "	lot of 10 cases	7.00
Four-Color Case	each	.75
" "	lot of 10 cases	7.00

TRUE DENTALLOY.

SURE. STRONG. WHITE.


TRUE DENTALLOY,
Sure. Strong. White.
Made and Tested in Accordance with the System of
PROF. G. V. BLACK. M.D. D.D.S.
By the First Graduate Amalgam Maker.

A SILVER-TIN ALLOY.

It has been pretty well established that the most useful alloys for dental amalgams—speaking generally—are those which are known as silver-tin, in which the percentage of silver exceeds that of the tin and any other metals. "True Dentalloy" is of this class. It is made after the methods of Dr. G. V. Black, which means that every step of the work of compounding, melting, cutting, and annealing is conducted carefully. It means also that the resulting alloy, because of the care with which it is made, can be depended upon to work the same way right along, provided the manipulation is uniform.

A POINTER.

If you want the best results possible, the printed directions which accompany each package should be followed. Those directions were formulated to afford a reliable guide to the most satisfactory use of the Alloy. It has been definitely established that the character of an amalgam filling varies with the proportion of mercury in the mass. A filling with 10 or 20 per cent. more mercury than is required will not be as durable as one in which just the right quantity is used. It is therefore important that the right proportions be known and be observed in mixing. The point is, that no matter how perfect the alloy, something depends on the dentist.

SOME PROPERTIES.

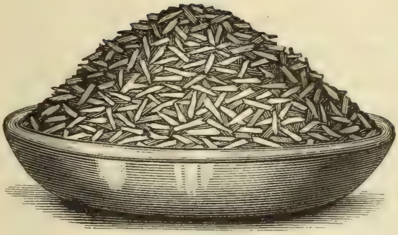
"True Dentalloy" is made of pure metals. It is fine-cut,—powdery,—because this state is believed to favor ready amalgamation. Combined with the proper quantity of mercury it makes an amalgam which gives a strong breaking, crushing, and "flow" test; which is white in color, and which is uniform. It does not contract; it expands slightly during the early stages of setting, and thereafter maintains its form and size. It sets in about fifteen minutes. It retains its properties indefinitely because it is properly annealed before being put up for sale.

AN ECONOMICAL PACKAGE.

Put up only in 1-oz. collapsible tubes like those used for artists' colors, with screw-caps. It is convenient to handle, prevents waste, and preserves the contents.

Price, in any quantity................................per oz. $1.50

GLOBE ALLOY.


Shavings.

Filings.

Wherever the characteristic qualities of a Gold and Platinum Alloy are required, the Globe will be found to meet the requirements.

It is a distinctively

High-Grade Gold and Platinum Alloy,

containing tin, silver, gold, and platinum. These are carefully alloyed so that the product is remarkably uniform in quality, and embraces all the advantages which the admixture of the higher metals confers.

Put up in filings, also in shavings, in ½-oz. and 1-oz. envelopes. For buyers in large lots we also put up each form in 4-oz. enameled metal flasks, with screw-cap.

Price, per oz.	$2.00
" in 20-oz. lots	30.00

"THE OLD RELIABLE."

Lawrence's Amalgam.

RES NON VERBA. TRADE MARK.

Who first named Lawrence's Amalgam "The Old Reliable" is probably lost in the mists of antiquity. Whoever it was recognized the characteristic which made the reputation of this Amalgam—its capability of being made into fillings which could be relied upon.

Lawrence's Amalgam is always put up in a white lithographed envelope, covering a brown one containing the Amalgam, with Trade-Mark on the lap of each, and both copyrighted. Put up in ⅓ oz., ½ oz., and 1 oz. envelopes.

PRICES.

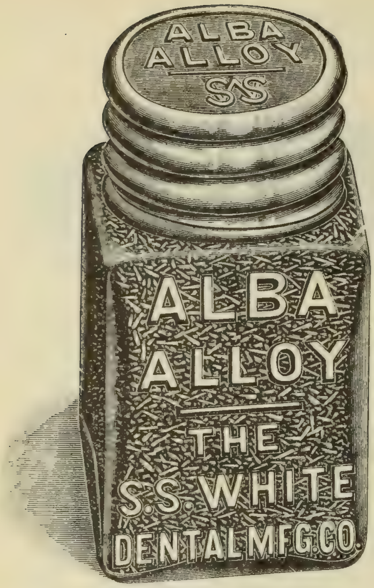
1 ounce...$3.00	2 ounces...$5.50	4 ounces...$10.00	10 ounces..$20.00

The S. S. White Dental Manufacturing Co., Sole Agent.

TOWNSEND'S AMALGAM.

Has the longest record of any Amalgam on the market,—nearly a half-century. A good, plain, old-fashioned tin and silver alloy which can be depended upon. Put up in ounce and half-ounce envelopes.

Price, in any quantity	per oz. $1.50



ALBA ALLOY.

"Alba" Alloy owes its name to its characteristic feature, namely, the whiteness of the Amalgam made from it. This whiteness is not merely that of a new surface. It is a permanent quality, due to the unoxidizable character of the material. Fillings of Alba Alloy remain white in the mouth, even when other amalgams discolor alongside of it.

Alba Alloy is easy working, sets about as quickly as the average, and takes a high polish. Usually, however, it looks better unpolished, as the surface produced by simply finishing with a strip of soft muslin or a pellet of cotton blends better with the surrounding tooth-substance, and is therefore less conspicuous.

Alba Alloy will give the best results when the directions for manipulation are closely followed.

Put up in glass bottles, with screw-caps, ½-oz. and 1-oz., and in 4-oz. cans or flasks.

Price, in any quantity	per oz. $1.50

The S. S. White Copper Amalgam.

Copper Amalgam has evidently found its legitimate place in dentistry. In place of the wild craze of a few years ago there is a steady, careful placing of it in the cavities to which its good qualities fit it, and where the disadvantages found in its indiscriminate use are not felt.

Our Copper Amalgam is, just as it always has been, fully equal to any, and superior to most of its class.

Put up in 1-ounce boxes.

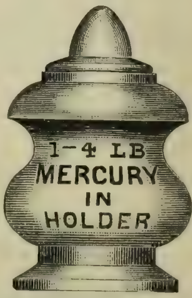
PRICES.

Ounce	$1.00
5 ounces	4.00

MERCURY.

¼ Pound in Bottle.

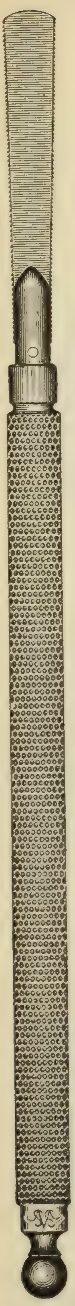
We sell the best re-distilled mercury only, specially prepared by a thoroughly responsible manufacturing chemist. Put up in quarter-pound bottles or holders. For safety in transportation we place each bottle in a turned wood box, sufficiently secured to prevent damage to other goods.

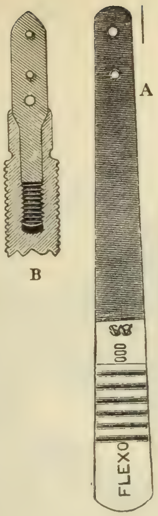


¼ Pound in Wood Holder.

PRICES.

Per bottle	$0.50
¼-pound in Holder	.50





PERFORATED FLEXO FILES.

Suggested by Dr. W. B. Fahnestock.

The perforations in the end of the file at A adapt it for insertion in the split chuck shown in section at B.

The unserrated part of the file is cut off and the instrument is ready for use as shown in the illustration.

Only Flexo Files Nos. 000, 00, 1, and 2 are perforated, and these become draw-cut when used in the chuck-holder.

PRICES.

Perforated Flexo Files, Nos. 000, 00, 1, and 2, Push-cut........each $0.15; per dozen	$1.40
Chuck File Holders ....each	.35
Socket Handles (No. 3) .... "	.15
Complete, one File, Chuck, and Handle....	.65
Complete, Chuck, Handle, and Assorted Dozen Files	1.85

PERFECTION TALKS FOR ITSELF.

We have been talking for Perfection Polishing Strips; now they are talking for themselves,—talking in the dentists' offices by their superior all-around work, talking in our office by their magnificent sales. The two go together. As fast as they are tried, they win their place; their place won, the sales grow. The whole history is a story of how real merit is bound to tell. Once more, let us say that these are, in their combination of the essentials,—thinness, toughness, efficiency, and durability,—the best Polishing Strips at the service of the dentist.

Perfection Polishing Strips are supplied in the following varieties:

Emery, **Garnet,** **Pumice,**
French Emery, **Flint,** **Rouge.**
Lava,

Put up in one-gross boxes, each kind separate, or assorted.
Price ....per gross $0.30

LINEN CLOTH STRIPS.

Very thin, very strong. 1 gross in a box.
Price ....per box $0.50

REDUCED.

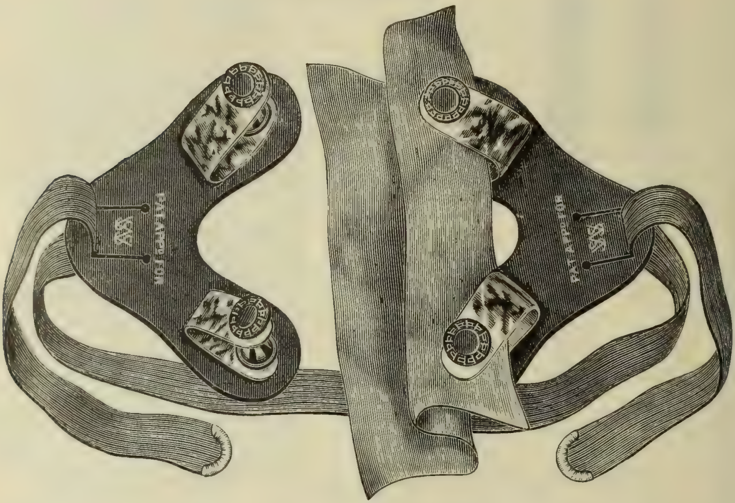
NERVE-DEVITALIZING FIBRE.

Our Nerve-Devitalizing Fibre is composed of arsenious acid, creasote, tannin, and opium, thus presenting all the qualities required in a devitalizer. It is reliable, has been before the profession many years, and has been used in thousands of cases with satisfaction.

Price, per jar, reduced to.......................................$0.50

THE CARMICHAEL RUBBER-DAM HOLDER,
No. 6.

Patented July 18, 1899.



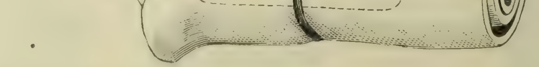
This Holder holds the rubber securely, smoothly, and safely; that is, without pulling the rubber to cause leakage around the tooth. The pressure of the lip or cheek is restrained and the rubber held out of the way by drawing the long ends of the ligatures behind and under the celluloid springs.

The elastic band is readily caught or released for adjustment, and the rubber may cover the nose for breath protection. In fact, every reasonable requirement of both the dentist and the patient appears to be fully met by this ingenious, expeditious, and satisfactory device. It is made of thin, polished, black vulcanite, and has glove snap-buttons with tortoise-shell celluloid springs.

Price ....each $1.00

DR. W. H. DUDDY'S
NAPKIN HOLDER AND CLAMP.

Patented January 1, 1897.

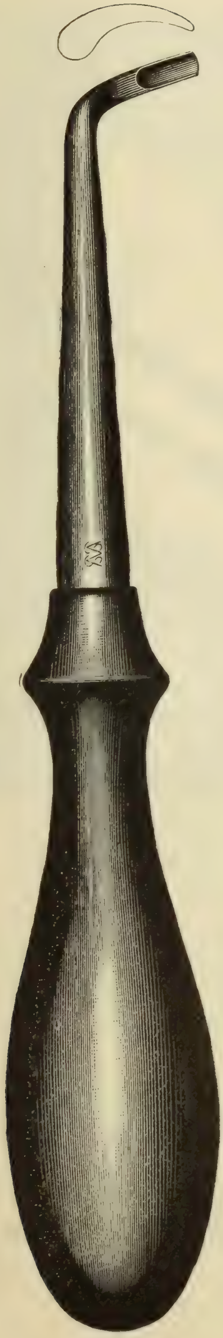


This appliance is made especially for carrying napkins made of Cottonoid, principally for use on the posterior portion of the inferior maxilla; although it can be used advantageously on the superior maxilla also. The wire should rest on the gum back of the last molar tooth, and the napkin should be forced well down on the lingual surface of the maxilla in order to compress numerous sublingual ducts and prevent the free flow of saliva.

The napkins can be rolled any size on an excavator handle, and then easily slipped over the ends of the holder.

Price $0.40

ROOT-EXTRACTORS.



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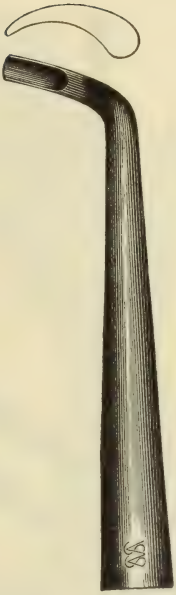

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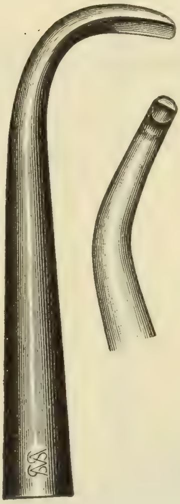

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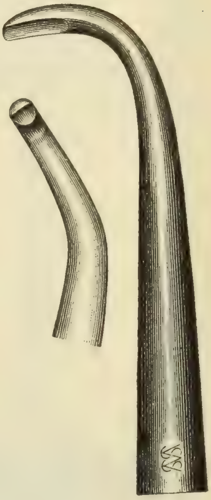


23

The Root-Extractors here represented have been designed to supplement our regular forms, and we believe their advantages will be readily appreciated. Nos. 20 and 21 are right and left instruments, generally applicable to frail roots that have slight attachment or are merely imbedded in the gum. Such roots are usually crater-like and present thin edges, easily crushed by forceps.

The points of the Extractors are concave, and will closely fit the convexity of the root. The edge is very sharp, and curved to the form of the gum-margin, beyond which it may be easily forced.

In Nos. 22 and 23 the points are of similar form, their distinctive features being the curve of the points and the bend of the shanks, which enable the operator to use the thumb as a fulcrum upon the teeth in the opposite side of the jaw.

The bend of the shank affords an unobstructed view of the operation. These Extractors are much longer than our regular line, and give an easy reach to the posterior teeth, while the handle is formed to admit of a forward grip in extracting anterior roots.

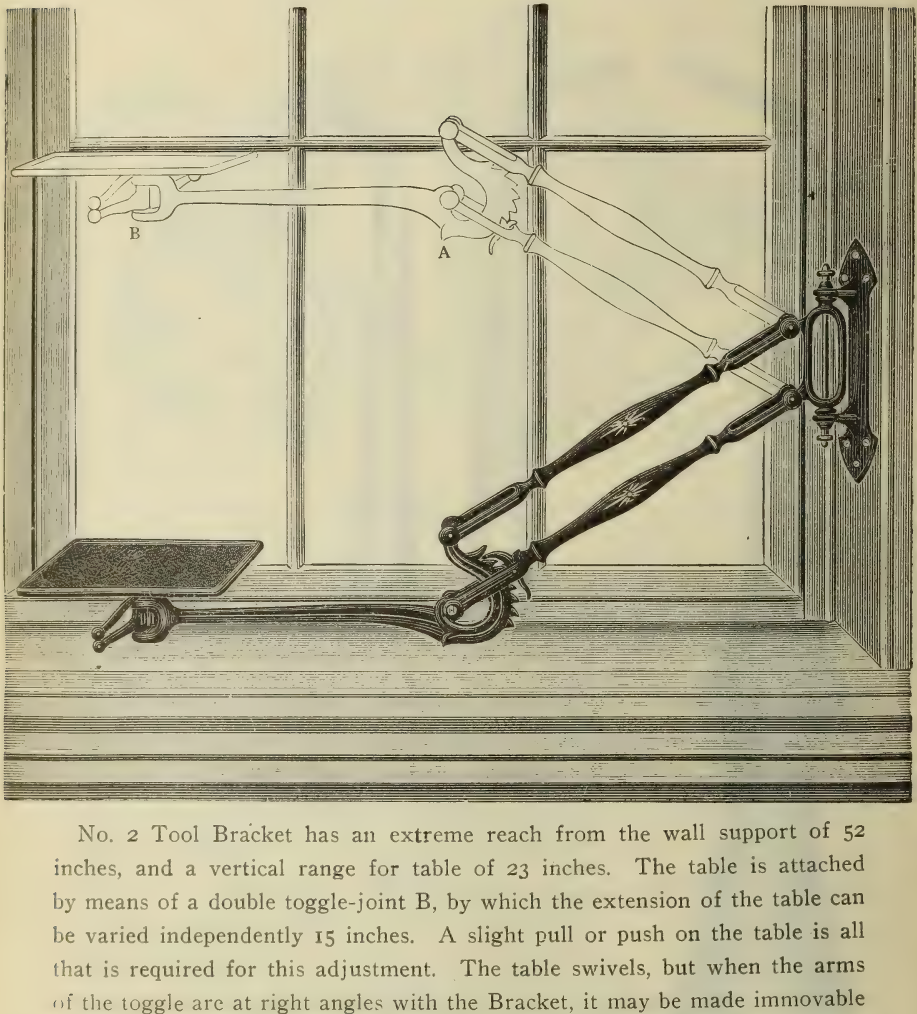
The illustrations are full size.

Price ....each $1.00

THE S. S. WHITE TOOL BRACKET No. 2.

WITH TABLE.

Patented September 18, 1894.



No. 2 Tool Bracket has an extreme reach from the wall support of 52 inches, and a vertical range for table of 23 inches. The table is attached by means of a double toggle-joint B, by which the extension of the table can be varied independently 15 inches. A slight pull or push on the table is all that is required for this adjustment. The table swivels, but when the arms of the toggle are at right angles with the Bracket, it may be made immovable by pressing the arms on both sides in the same direction, either forward or backward.

The height of the table is governed by a ratchet controlled by a trigger. It is raised by simply lifting to the desired height, and lowered by releasing the ratchet from the trigger.

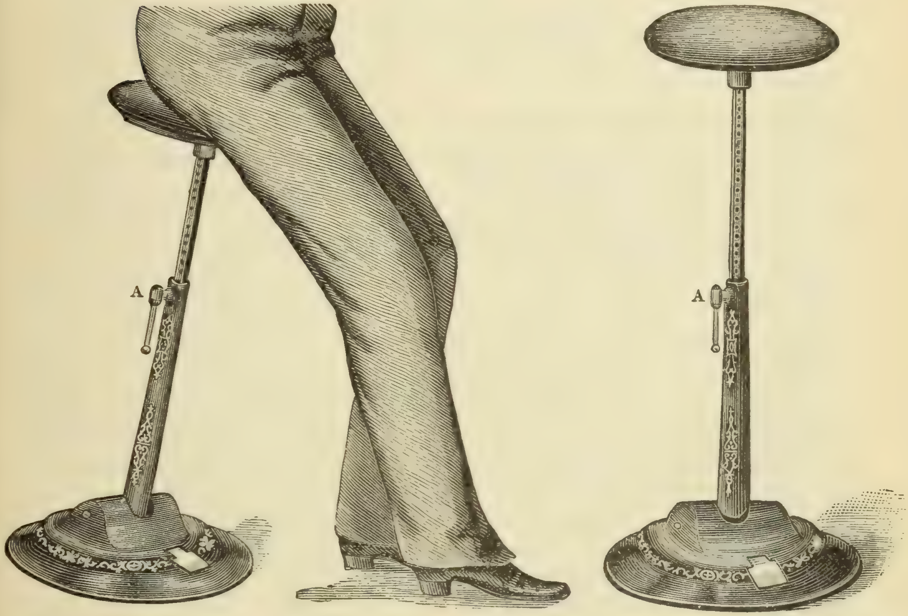
Japanned bronze ornamentation.

The Table made especially for the Bracket is a plain tray, 12 inches square, covered with leatherette, raised rim, no drawers.

Price, complete as illustrated..............................$10.00

BOXING $0.50.

THE LYON IMPROVED ADJUSTABLE STOOL.



By the use of the Lyon Improved Adjustable Stool fatigue caused by long operations is materially lessened. The *inclined position* (shown in the first cut) gives a peculiarly agreeable sensation of rest and comfort, the seat coming *well up at the back, thereby supporting the spine,* giving freedom of action to the limbs, and allowing the feet to rest upon the floor, dispensing with the necessity of a foot-rest.

The seat revolves on a rod sliding in a standard; the standard trunnioned within the base is locked by a ratchet controlled by a treadle. To provide for variations in height, the sliding rod is grooved at one side, and in the bottom of the groove at intervals of a half-inch holes or pockets are drilled for the reception of the plunger near the top of the standard.

The seat can be raised from 23 to 35 inches from the floor by pulling out the plunger and carrying the seat to the height required, when releasing the plunger it will automatically lock the sliding rod. The angle of the Stool can be easily and quickly changed by the operator while seated by pressing the heel on the treadle.

Base and standard japanned black, neatly ornamented, plunger and treadle nickel-plated, seat upholstered with curled hair, and covered with maroon or green plush or leather.

Price $15.00

BOXING FREE.

PYROZONE (H_2O_2).

The main reason for the constantly growing popularity of the Pyrozone preparations is that they are H_2O_2 all the time. The dentist who takes one of these preparations for his hydrogen peroxid is sure that he has always hydrogen peroxid. They are absolutely stable solutions of that drug. Two forms.

Medicinal Solution of Pyrozone, 3 per cent. H_2O_2 Aqueous.

Wherever a cleansing mouth-wash is required, as in abscess and pyorrhea, Medicinal Pyrozone is the indication. As an antiseptic in all infectious conditions of the oral mucous membrane it produces remarkable results. No risk of toxic effects. Put up in 4-oz. glass-stoppered bottles.

Price, Medicinal Pyrozone	per bottle	$0.50
" " "	" dozen	4.50

Caustic Solution of Pyrozone, 25 per cent. H_2O_2 Ethereal.

Caustic Pyrozone is a powerful and safe antiseptic and bleacher; causes no permanent injury to normal tissue. Has the special stimulating characteristic sometimes required in pyorrhea. Put up in sealed glass tubes.

Price, Caustic Pyrozone	per tube	$0.75

The sale of the 5 per cent. Ethereal Solution of Pyrozone has been discontinued. This solution can readily be prepared by diluting 1 part of 25 per cent. ethereal solution with 4 parts of pure sulfuric ether. The container must be clean and glass-stoppered.

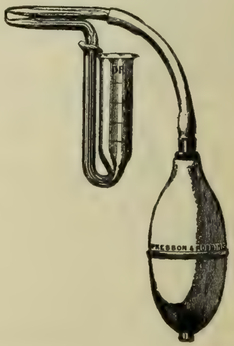
Pamphlet describing pyrozone and detailing methods of use free on application.

The 3 per cent. solution can only be sent by express. The 25 per cent. solution can be mailed at an additional expense of 10 cents.

Atomizer for Pyrozone.

An Atomizer, specially adapted for the exhibition of Pyrozone, is made in three forms: straight spray, up spray, and down spray.

Price, with one Spray Tube, either form		$1.25
" Extra Spray Tubes for same	each	.75
" Pyrozone Inhalers	"	.25
" " Syringe	"	.25
" " Probe Cups	"	.15



DENTAL COSMOS SUBSCRIPTION BUREAU.

The Dental Cosmos will undertake to properly place orders from its subscribers for any periodicals they may wish at the regular publishers' rates. Thus, if a subscriber for the Dental Cosmos in Russia or Japan, for instance, wishes also to receive other American periodicals,—dental, literary, or what not,—he need only include in his remittance to us a sufficient amount to cover the subscription price and postage for the periodical or periodicals desired, and we will do the rest. It will save him writing separate letters in each case, besides the extra postage.

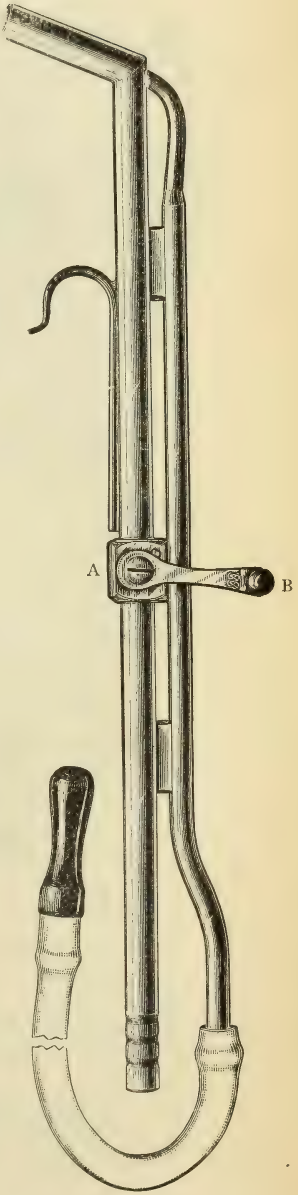
LEE BLOW-PIPE.

IMPROVED.

This blow-pipe has won favor by the great volume of its brush-flame for heating up work, by the fine point of its wire-flame for flowing solder, and by keeping alight.

We have made it simpler by omitting the spring and using the screw A to frictionally adjust the lever B to permit its free movement under the thumb or finger and yet hold it still whenever the lever is let be, thus the full, partial, or fine flame can be continuously directed on the work; or the lever may instantly be moved to vary the flame at will. By this means the soldering process is simply perfected.

Price $3.00



SODIUM AND POTASSIUM

FOR TREATING PUTRESCENT ROOT-CANALS.

IN SEALED GLASS TUBES.

Prepared by Dr. J. E. Ward.

The combination of Potassium and Sodium has been described as wonderfully effective in getting to the end of a root, as in treating a putrescent canal, while almost entirely free from irritating properties. For this purpose its use has come to be the accepted treatment. It cleanses and purifies the canal promptly and thoroughly, so thoroughly that it can at once be filled safely without further treatment.

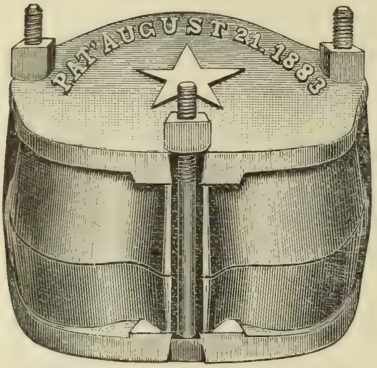
Sodium and Potassium is also excellent for cleaning a tooth before crowning and as a bleaching agent, whether used alone or in conjunction with Pyrozone.

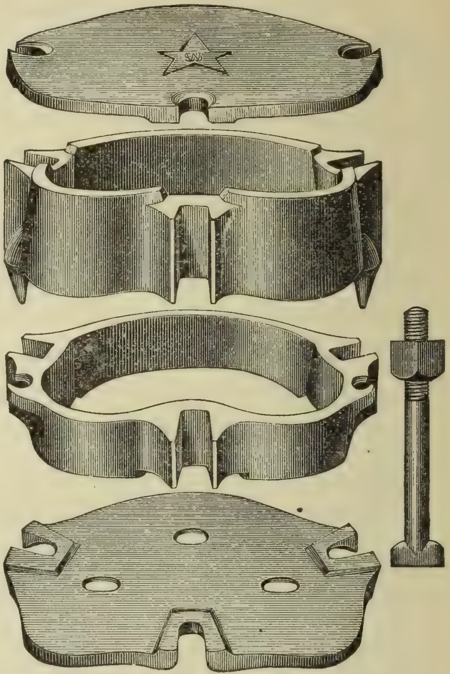
Put up in sealed glass tubes.

Price, per box containing 6 tubes..........................$1.00

THE S. S. WHITE DENTAL MFG. CO., Sole Agent.

THE IMPROVED STAR REVERSIBLE FLASK.





It is easy to understand why the Star Reversible Flask leads. It is very convenient, and it practically gives two flasks for the price of one. The detail illustration shows the top and bottom plates and the two rings, all separated, and the form of the bolt.

The wide ring has a long bevel, the narrow a short one, so that each fits the top and bottom interchangeably. The narrow ring is used next to the bottom plate, for whole dentures where the parting is at the rim of the plate. By using the wide ring next to the bottom, an admirable Flask is obtained for deep cases and partial sets, or where the artificial rim rests on the natural. The plaster runs into the holes in the bottom plate, so that when set the plate is attached to the ring for the time being as firmly as if made of a piece with it. The heads of the bolts are T-shaped to fit the slots in the bottom plates, and are free at both ends.

The general shape of the rings is that of a heart, thus economizing in the use of plaster. The ease with which the plaster is removed is not the least of the advantages.

Two sizes, with inside measurements of the rings at the parting line as follows:

Regular, 1½ inches deep, 2⅜ inches across the narrowest part,—from the point to the depression between the two lobes,—and 3⅛ inches at the widest part.

Extra large, 1¾ inches full x 2½ inches full x 3¼ inches.

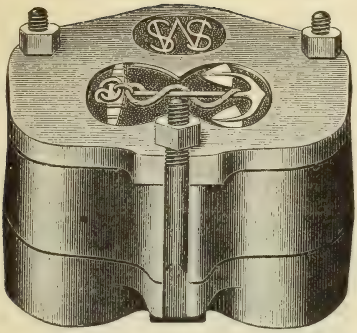
The bolts in the extra large size are correspondingly heavier.

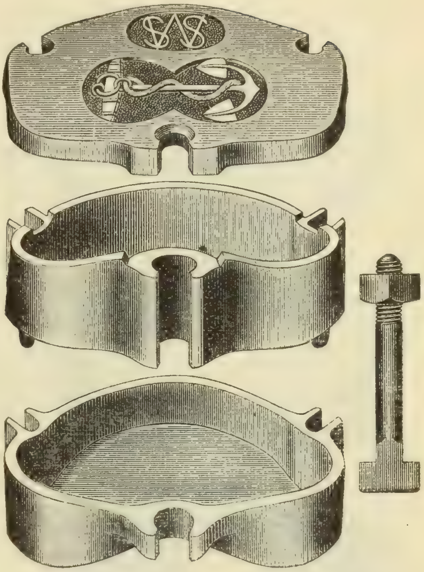
Made in malleable iron and brass.

PRICES.

Regular, Malleable Iron, Nickel-plated	$0.80
“ Brass	1.25
Extra Large, Malleable Iron, Nickel-plated	1.25
“ Brass	2.00

ANCHOR FLASK.

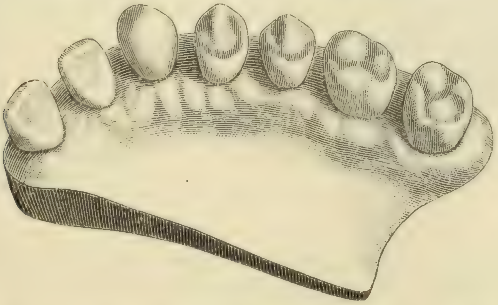




The special feature of this Flask is the formation of three pairs of projecting ribs in the sides of the ring at points opposite the lugs for the bolts on the top and bottom plates. These ribs support the lugs, so that no matter how great the pressure brought to bear they are not broken or bent. The Flask is a generally useful one, but is especially so when extreme pressure is necessary, as for instance, in celluloid work.

Price, Iron	$0.80
" Brass	1.25

TECHNIC TOOTH FORMS.



The modern technic teaching trains the student in the dental college in all the steps of preparation of cavities and packing fillings into them before he is allowed to try his " 'prentice hand" on the teeth of a human being. It is good practice, but there is difficulty in getting enough teeth for the students' work.

To remedy this we offer the Technic Forms. Each Form contains examples of the incisors, cuspids, bicuspids, and molars of the upper jaw. They are molded from natural forms, and arranged so that there is ample room around each tooth.

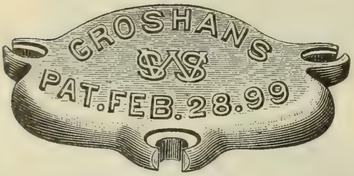
The Forms are made of a light-colored vulcanite, which is hard enough to afford sufficient strength in the margins of the cavities to be cut, and with a sufficient body of material behind them to give all the solidity required in filling them.

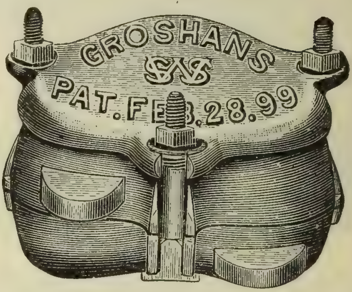
The Technic Forms will doubtless find large use among students as dummies upon which to practice the various steps of filling operations.

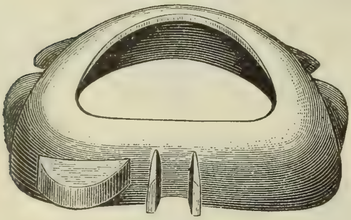
Price ....each $0.80

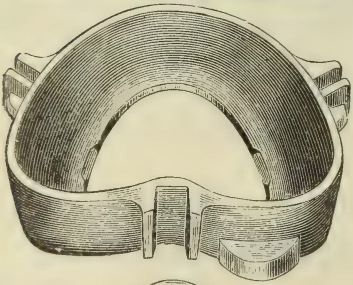
THE GROSHANS DENTAL FLASK.

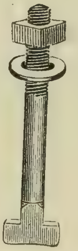
Patented February 28, 1899.

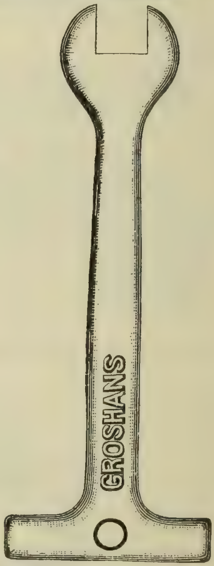


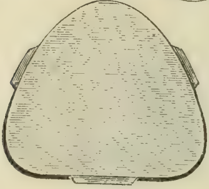












This Flask consists of four parts, an upper and a lower half and a top and a bottom plate, each separable from the others. The general shape is that of a half oval. The two halves, instead of having straight sides, are concaved, so that the outer openings are considerably smaller than the two which come together when the Flask is closed.

The curved-over upper half holds the portion of the investment which carries the teeth firmly in such wise as to prevent, in Gum Teeth the opening of joints, and in Plain Teeth any spreading apart, when the pressure is applied.

The heel of the Flask is straight, from side to side, to allow the greatest possible room for the model, the strength of which is thereby conserved, as it does not have to be trimmed in the center at the back, the point where it is thinnest and weakest.

On each of the two halves, at the back, a substantial lug will be seen. These lugs are there to save the rim of the Flask in removing the investment. Instead of tapping on the rim for this purpose, a sharp tap on the lug will loosen the entire plaster investment of that half. In this way no risk is run of fracturing teeth or plate, and the rim is kept in good order, so that the two edges shall always make a smooth, well-fitting contact.

The concave form of the interior of the two halves of the Flask facilitates the removal of plaster.

The removable bottom plate has three little projections on the sides, which fit into depressions on the inner side of the turned-under lower half. This forms a perfect bottom to the Flask, yet one which facilitates the removal of the plaster when the plate is taken out.

The top-plate has three projecting prongs on its under surface, which help to fix the position on the Flask by engaging with the edges of the smaller opening in the upper half. They also prevent the lid from falling off in lifting the Flask from the hot water to remove the wax. The slots for the bolts are provided with depressions into which fit washers, placed under the nuts, holding the bolts from slipping, and preserving the edge from wear.

The bolts have the usual T-shaped heads, and are provided with washers as guides and preservatives of the bolts.

One end of the wrench is formed into a double-faced hammer, so that it comprises in itself all the tools required to close and open the Flask.

To sum up, the Groshans Flask is offered to the profession, as affording convenience and security in vulcanizing; as being readily and quickly cleaned of plaster after the case is completed; as being strong and durable—the washers on the bolts are the chief points of wear, and these are easily replaced.

PRICES.

Iron, Regular, Nickel Dipped	each $1.40
" Large " "	" 1.50
Brass, Regular	1.75
" Large	2.00
Wrench	.15

ARTICULATING DISKS.

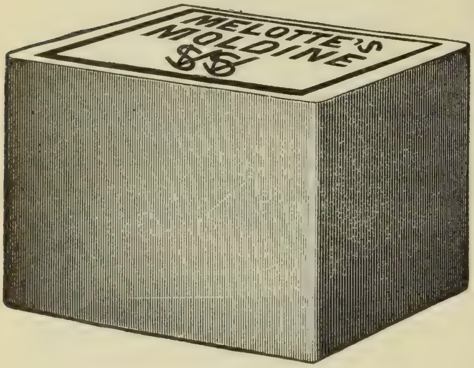
These little Disks of articulating paper are intended to facilitate the fitting of Logan Crowns to the ends of natural roots, as described by Dr. E. C. Kirk in the Dental Cosmos for June, 1894, and quoted in our Crown- and Bridge-Work pamphlet. They are slipped over the pin of the crown, which is then firmly pressed to place, so that the points which want to be ground off are plainly marked in black. They are ⅜ in. diameter.

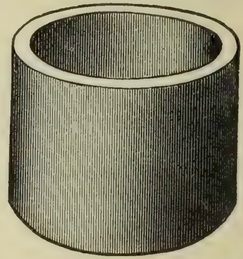
Put up in boxes of 100.

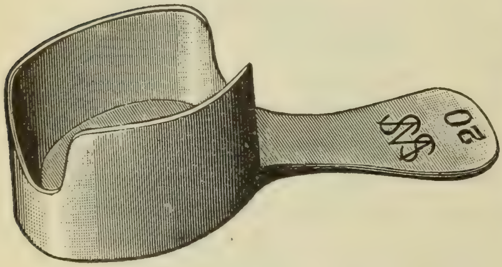
Price	per box $0.10

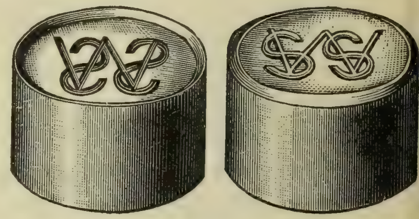
DR. MELOTTE'S MOLDINE.

Impression Cup, Ring, and Fusible Metal, for Crown Dies and Counter-Dies.









With Moldine an impression of one or two teeth or roots may be taken and dies made in less than five minutes. Gold caps or regulating fixtures may be accurately fitted by means of these dies. Dr. Melotte and others have found these devices to simplify and expedite crown- and bridge-work. Moldine is also an immediate investment for work to be soldered; solder will not flow over the part covered with Moldine. Metal work may be thus made or repaired without waiting for the investment to dry or set. If Moldine stiffens by use, knead in a little glycerin.

Instructions accompany each package.

In ordering Moldine sent by mail please add to the remittance the postage, 20 cents for the complete apparatus; 10 cents for the material alone.

PRICES.

Complete Outfit, inclosed in a tin box containing one-half pound Moldine, one Impression Tray, one Ring, and two ingots of Fusible Metal	$1.25
Melotte's Moldine. . . . . per half pound	.40
Impression Cup (S. S. W. No. 20)	.25
Rubber Ring	.05
Fusible Metal, per ingot (about 2½ ounces)	.30

CALCAR.

A Substitute for Molding Sand.

Suggested by DR. A. D. GRITMAN.

CALCAR'S ADVANTAGES.

This compound is free from some of the objections to the various forms of Molding Sand. It does not require the care to keep it in good condition; is free from odor, both in the can and when having metal poured into it; does not become "lumpy" from use; does not dry out and require retempering when exposed to the atmosphere.

CALCAR HYGROSCOPIC.

As a matter of fact, while it will lose a portion of its moisture when used continually—the frequent contact with the molten metal is bound to cause evaporation—all that is necessary is to leave it exposed to the air for a few hours, and its working quality is restored, because it is hygroscopic.

CALCAR AS A WORKING ALLY.

Calcar is clean, sightly, and may be said to be always ready for use. It copies models exactly and smoothly in every detail. Models and dies may be cast in it with zinc, babbitt-metal, or any of the fusible alloys. Any style of flask may be used.

CALCAR "WEARS WELL."

Calcar as sold has just moisture enough to work well. With little care it keeps in good condition for years. A tin can is a good receptacle to store it in. Whenever it begins to show a little dryness, a short exposure to the air will enable it to absorb sufficient moisture to restore its condition.

Put up in 2-qt. cans.

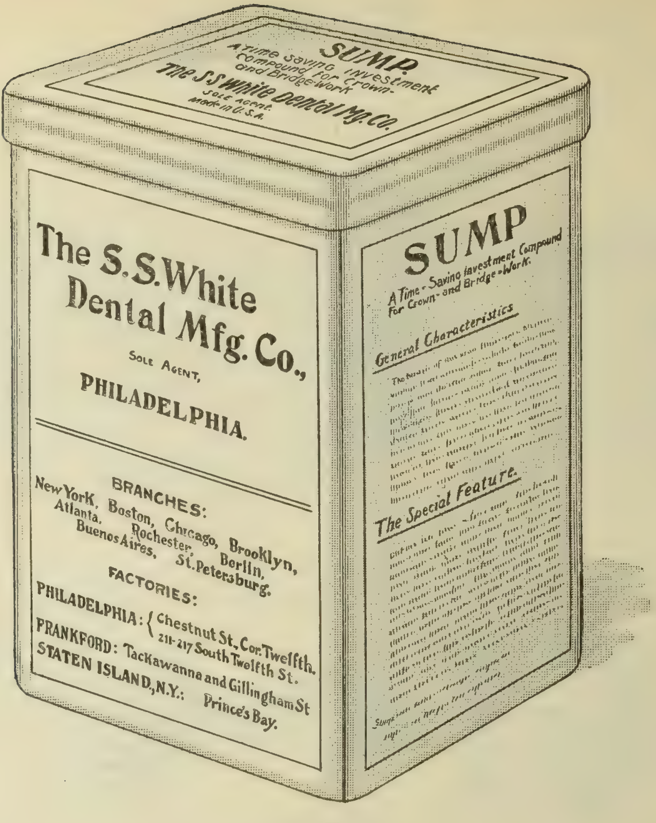
Price .... per can $0.30

"Perfection of Design

for dentists' burs, perfection of workmanship in executing the design" is the claim which was made for "Revelation" Burs when they were first offered to the profession nearly ten years ago. They still stand as the most effective burs ever made for dentists' use. They cut faster, cleaner than any others, with less discomfort to the patient. They are more durable and therefore cheaper to use than any others, and their constantly growing sales show that their superiority is appreciated.

PRICES.

Smaller Sizes	per doz. $1.50;	per half gross $7.50
Larger "	" 2.00;	" " 10.50


SUMP
A Time Saving Investment Compound for Crown- and Bridge-Work
The S.S.White Dental Mfg. Co.
Sole Agent
Made in U.S.A.
The S.S.White Dental Mfg. Co.,
Sole Agent,
PHILADELPHIA.
BRANCHES:
New York, Boston, Chicago, Brooklyn, Atlanta, Rochester, Berlin, Buenos Aires, St. Petersburg.
FACTORIES:
PHILADELPHIA: { Chestnut St., Cor. Twelfth. 211-217 South Twelfth St.
FRANKFORD: Tackawanna and Gillingham St
STATEN ISLAND, N.Y.: Prince's Bay.
SUMP
A Time-Saving Investment Compound for Crown- and Bridge-Work.
General Characteristics
The Special Feature.

SUMP.

SAVES TIME.

Sump mixes quickly, because it requires little water, and dries out quickly, because it gives up the water easily. An investment of it can be put into the oven or under the blow-pipe almost as soon as completed, so that the soldering can go on promptly. It thus facilitates rapid work and saves valuable time.

AN UNEXCELLED INVESTMENT.

Sump makes an investment at least equal to that of other materials. It makes a good model, it holds together firmly, it does not crack, it can be built onto with the assurance that the built-up portion will not separate in the firing, it holds the teeth securely and protects them, and it is readily removed from the model after the soldering is completed.

NO BETTER.

These qualities make it a desirable convenience for the laboratory. It gives good results, it saves time. There is no better material for its uses.

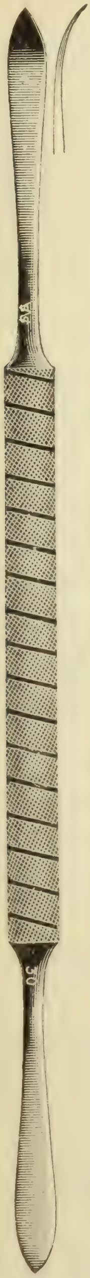
Sump is a powder of pale lilac color, which becomes deeper when it is mixed.

Sold in one quart cans (2¼ lbs.) and in bulk.

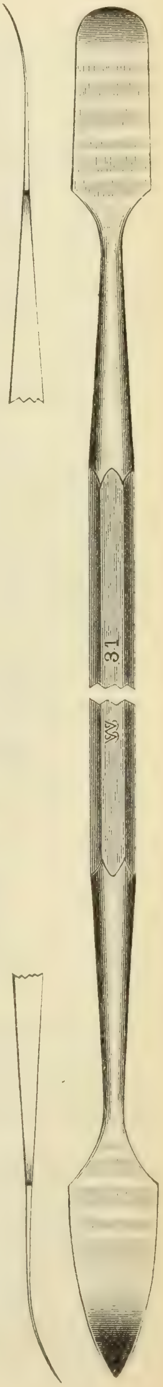
Price...per can $0.75
" ....(bulk, 10 lbs. or over) per lb. .25
" ....per ¼ bbl. 15.00

ADDITIONAL WAX SPATULAS.

No. 30.
By Dr. L. P. Haskell.



No. 31.
By Dr. A. D. Gritman.



Wax Spatula, No. 30.

Dr. Haskell has long been regarded as one of the most skillful prosthetic dentists. This Spatula for shaping and carving the wax is an important appliance in his methods. It represents his idea of the most useful form. The working blades are rather narrow, one straight, one curved, with spear points. The handle is rather heavy, of knurled steel. We have made this Spatula for years on special orders and to supply the students in his classes and others who had been impressed by Dr. Haskell's descriptions of his methods. It is now placed regularly before the profession, as No. 30 of our line of Spatulas.

Price, Wax Spatula, No. 30........$0.50

Wax Spatula, No. 31.

Dr. Gritman's Spatula, it will be observed, has large working blades. The principal use of this Spatula is in waxing up cases for soldering. The broad blades enable the operator to carry a considerable quantity of softened wax from the flame to the model, which cannot be done with small, narrow blades. Then, again, the size enables them to retain the heat better, which will be found to facilitate the work of waxing. The curves of the blades will be found well adapted to the lingual contour of the models. The pointed blade is for waxing between the teeth, either labial or lingual surface.

This Spatula will be found to be a very complete all-around appliance for its work.

Price, Wax Spatula, No. 31.........$0.50

POULSON'S SHADED RUBBERS.

Patents applied for in Germany, England, and the United States.

The older forms of these Rubbers (the Pink) have received the approbation and patronage of many prosthetic dentists interested in the production of esthetic dentures. The newer forms (the Shaded Crown and Shaded Kamerun) are adaptations of the same principles of manipulation to the more widely used forms,—namely, those employed for the body of the dentures.

Shaded Pink Rubber No. 1, Light. This form was devised to supply the defects of monochrome pink rubbers in imitating the gum-tissue. It helps to give a natural appearance to the denture.

Shaded Pink Rubber No. 2, Medium. Produces a somewhat darker gum color than the No. 1. In other respects it is very much the same. The two shades will cover the range of difference in color of natural gum-tissue very well.

Shaded Crown Rubber. This new candidate for favor is a base-plate rubber compounded on the same principles as the Pink Rubbers,—namely, by mixing several shades, which gives a plate, when vulcanized, of a more natural appearance than the usual single-color rubber.

Shaded Kamerun Rubber. Also a new form. It is founded on the Jet Black Kamerun Rubber, and shows in the finished plate tracings of various shades. It is tough and strong.

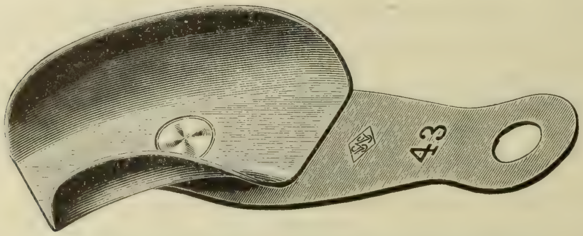
A circular, showing applications in colors, will be sent on application.

Each of these varieties is put up in ⅕-lb. packages.

PRICES.

Shaded Pink Rubber, either variety	per package	$1.50
" Crown or Kamerun Rubber, either variety	"	1.00

BRIDGE IMPRESSION TRAY, No. 43.



This Tray, for partial impressions, is so constructed that the Tray has an independent swiveling motion, so that it can be adjusted to any angle, and can be applied to any portion of the mouth. It thus gives the functions of several trays in one appliance. The new Tray will be known as No. 43 of our line.

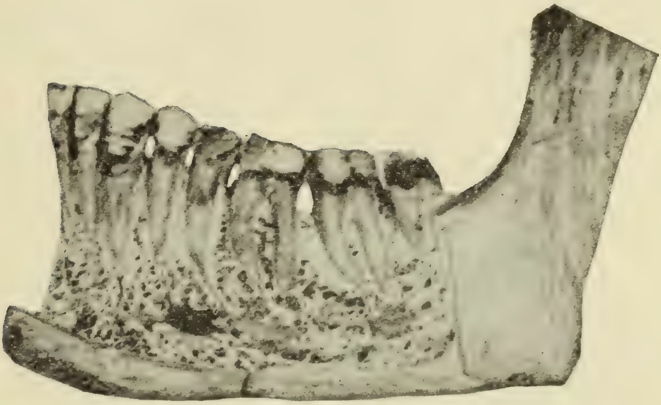
Price $0.20

$99\frac{299}{300}$ Per Cent.

perfect is the latest record of "Revelation" Burs. That comes very close to verifying our statement that when you buy $100 worth of our products you get 100 per cent. of first-class quality, so far as these Burs are concerned. It is a record not even approached in any others.

Lantern Slides.

FOR USE IN LECTURES ON ANATOMY.



For obtaining knowledge of an object of any sort, the best means is an examination of the thing itself. The next best is a good photograph, large enough to show the parts clearly. In teaching anatomy it is impracticable to pass around the class the various sections which show the features to be impressed; only one or two could see them at a time.

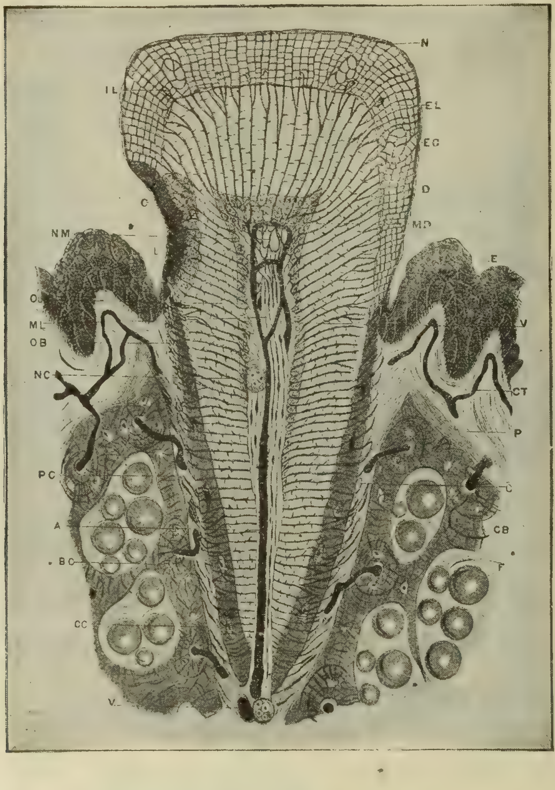
Recently Dr. M. H. Cryer has made some important advances in the more accurate knowledge of the anatomy of the teeth, and has furnished specimens from which these Slides have been made.

By the use of them teachers and students will alike be benefited. The large picture thrown upon the screen will make the smallest detail clearly visible to every member of the class, and impress the words of the lecturer almost indelibly upon the mind of the student.

Literary bureaus sometimes call upon dentists to give a popular lecture upon the teeth, and an address which, without picture illustrations, would hardly be understood, except by students of anatomy, may by the use of these lantern slides be made perfectly clear and interesting to a popular audience. We supply all of the slides illustrated in Dr. Cryer's paper in the Dental Cosmos of January, 1896. Others will be added as requested.

Price ....each $1.00

Diagram of an Incisor Tooth.



This illustration represents the large diagram, size 13½ x 9½ inches, of an Upper Central Incisor, printed in six colors, which was published under the direct supervision of Prof. Frank Abbott, M.D., and by the request of the Dental Society of the State of New York.

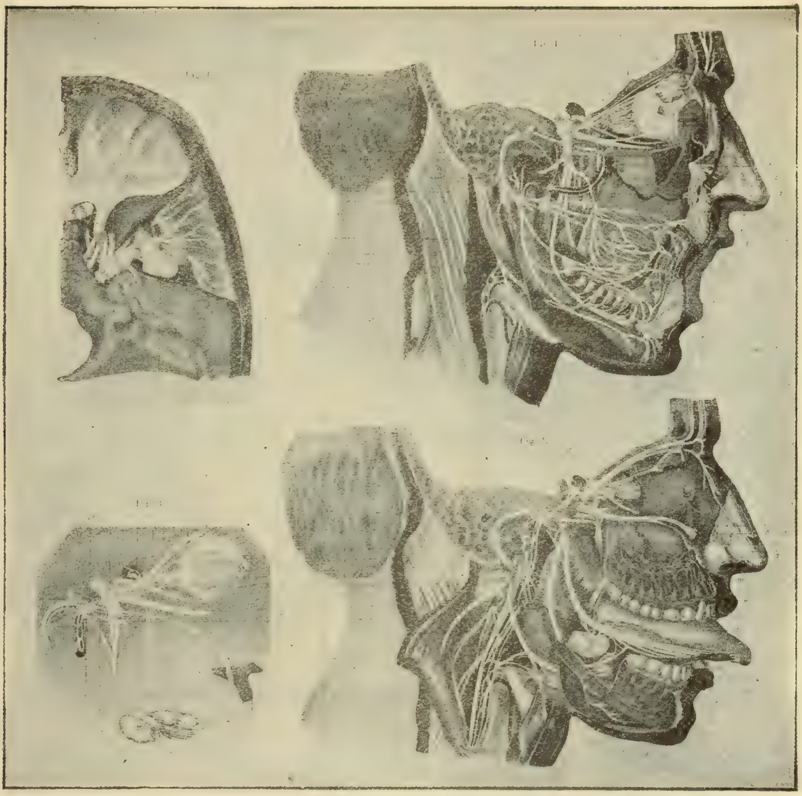
The object was to give to the dental profession a correct idea of the minute anatomy of a tooth. If not absolutely perfect microscopically, it approximates so closely to nature that it conveys to the mind at once an intelligent understanding of the structure and relations of the organ.

It shows, clearly, Nasmyth's membrane; the enamel, dentin, cementum, and pulp, with periosteum and socket of alveolar process covered by the gum; the blood-vessels and nerves of the pulp; the odontoblasts surrounding the pulp; the direct connection of the non-medullated nerve-fibers with the odontoblasts, and the passing of those fibers between these bodies into the dental canaliculi and the distribution of living matter in almost every direction throughout the dentin, finally reaching the interzonal layer (interglobular space), whence it enters the enamel, to which it is more minutely but as clearly distributed.

Mailed in pasteboard roll to any address.

Price $1.00

Diagram and Description of the Fifth Pair of Nerves.



This reduced illustration gives but a faint idea of the completeness of our colored chart of the Fifth Pair of Nerves. The figures are nearly or life-size in the chart, and show the final ramifications of the nerve in every direction.

Fig. 1 shows the ganglion of Gasser, its three branches, its divisions and subdivisions, and their connection with the other nerves.

Fig. 2 shows parts not so clearly seen in Fig. 1; the ganglion of Gasser and its branches are detached, so as to show the nerve-plexus of the internal carotid artery.

Fig. 3 shows the connection of the fifth pair with most of the cranial ganglia.

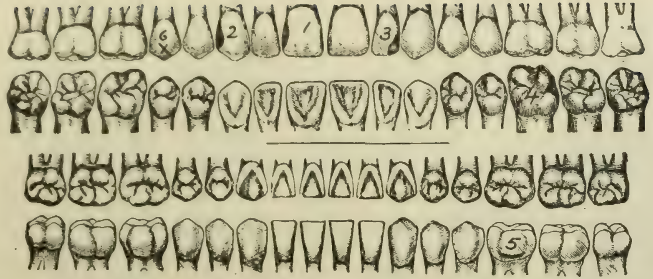
Fig. 4, the collateral or motor branches of the inferior maxillary nerve, viewed from the cranial cavity.

The entire chart is twenty inches square. Finely colored. Drawing by Henry A. Daniels, M.D.

A pamphlet containing a detailed description and key, by Harrison Allen, M.D., late Emeritus Professor of Physiology in the University of Pennsylvania, accompanies and is included in the price of the chart.

Price	$1.00
" - mounted on Rollers	1.50

THE
Warren Improved Dental Ledger.



Mr. John Doe
1769 Easy St.
Recommended by Mr. Richard Roe.

1895		No.	Gold Filling.	Amalgam Filling.	Phos. Zinc Filling.	Gutta Percha Filling.	Tin Filling.	Artificial Crown.	Bridge.	Treatment.	Cleaning Teeth.	Extraction.	Artificial Denture.	Time Reserved.	Dr.	Cr.	MEMORANDA.
Feb.	20	1	✓												7 50		
"	"	2	✓												5 00		
"	21	3			✓										2 50		Pulp capped with Asbestos
"	"	4		✓											2 50		
"	"	5				✓									2 50		
"	23	6						✓							20 00		Richmond Crown - two pins.
March	3															40 00	
															$40 00	$40 00	

THE WARREN IMPROVED DENTAL LEDGER.

No. 1.

One of the most important features in the Warren Dental Ledger is the diagram, admittedly the best ever offered.

The headings cover all the usual operations, and an ample column offers opportunity for making special notes.

308 pages, each 10 x 15 inches, 88 of which have three diagrams each, 132 having two, and 88 having one each, thus affording opportunity for long, medium, and short accounts.

The method of keeping an account (demonstrated on the opposite page) is to number the operation consecutively, placing the same number on the tooth treated, then the date, number, and amount, with a check mark under the heading which designates the operation.

Bound in red leather, red cloth sides, with red edges. Ample Index.

Price $3.00

We can supply Warren Dental Ledgers, made to suit special needs on order. Thus, if one wishes to have a book composed entirely of one account or two accounts or three accounts to the page, or omitting any one of the sizes, we will be glad to quote special prices.

WARREN IMPROVED DENTAL LEDGER.

No. 2 (SQUARE FORM).

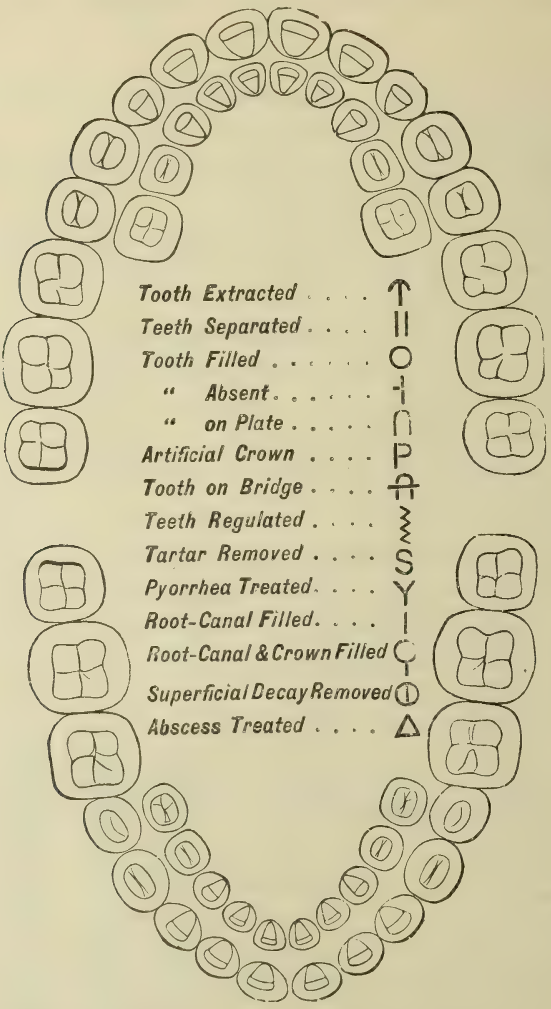
In response to a number of requests we have brought out a new edition of the Warren Improved Dental Ledger with pages about two-thirds the length of the well-known form. The book is thus about 10½ inches square. There are two sizes of accounts, two to the page and one to the page, and these are distributed throughout the book, first eight of the one-account pages, then eight of the two-account and so on, with an extra eight of the two-account pages at the end. There are 312 pages in the book, giving 320 short accounts and 152 long ones, a total of 472. The short accounts contain seven lines beside the diagram, spaces for name and address, etc.

Bound in red leather, red cloth sides, with red edges. Ample Index.

The diagram used in these Ledgers is universally conceded to be the best ever offered to the dental profession, as it shows every surface of each tooth equally well.

Price.. $2.50

Allport's Improved Registering Dental Ledger.



Tooth Extracted . . . . ↑
Teeth Separated . . . . ‖
Tooth Filled . . . . . . ○
" Absent . . . . . . ┤
" on Plate . . . . . ∩
Artificial Crown . . . . P
Tooth on Bridge . . . . ╤
Teeth Regulated . . . . ≀
Tartar Removed . . . . S
Pyorrhea Treated . . . . Y
Root-Canal Filled . . . . |
Root-Canal & Crown Filled ♀
Superficial Decay Removed ⦶
Abscess Treated . . . . △

Has been extensively used by the dental profession for more than a quarter of a century, and holds its own to-day as the most popular account book for dentists. It covers the needs of any form of practice, and affords a simple, easily-kept, accurate record.

Two accounts to the page, each with diagram as shown with place for name, reference, date of operation, charges, and credit for amounts paid.

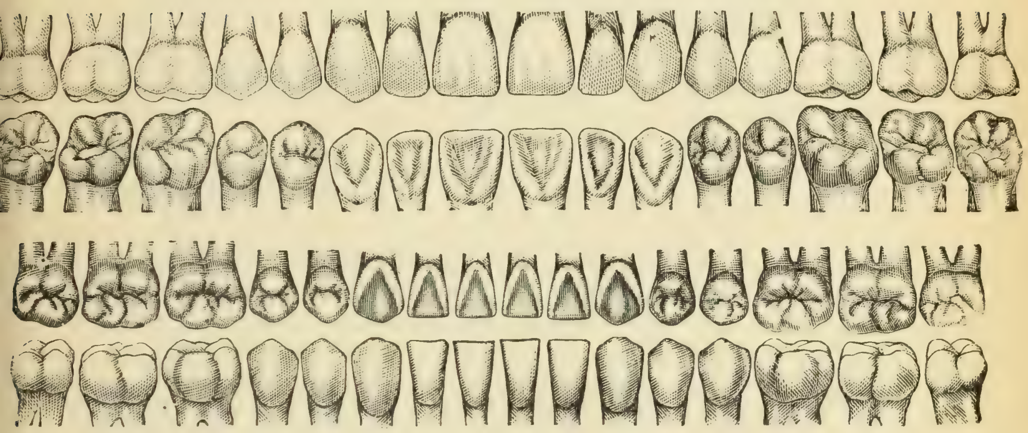
Good paper, substantially bound, with ample index. In stock regularly as priced below.

Larger books (more pages) made to order at moderate prices.

PRICES.

340 Pages, Half Turkey, Cloth Sides	$3.50
340 " " Roan, Paper "	3.00
172 " " " " "	2.00

ALLAN'S EXAMINATION RECORD.



If you use the Warren Improved Dental Ledger, the kind of Examination Blank you will want will depend on circumstances. If you want the blank simply as a memorandum, you will use the No. 3 Blank (see page 56), but if you want to keep the Record of the Examination where you can refer to it in a moment, you will use the Examination Record as devised by Dr. Chas. F. Allan. In this Record the diagram shown above is printed on leaves (one side only). At the bottom of each leaf are blanks for the name of patient and date of examination, the space intervening being used for such memoranda as may be required. The leaves are bound in oblong books containing 100 each, on the front cover of which is the imprint "Examinations. From............to.........."

Keeping these accessible, the dentist has only to refer to his ledger to get the date of any examination made; then turn to the "Examinations," and it is but a moment's search to find the one wanted.

The diagram is the most complete in its exposition of the various surfaces of the teeth that has yet been brought forward.

We have also the books with the leaves numbered, and four ruled pages for indexing.

The book contains 100 leaves, 5¾ x 7½ inches, with the diagram on each leaf.

PRICES.

Per book of 100 Diagrams, 5¾ x 7½ inches..................	$0.30
" " Indexed and Paged	.40

Dentists' Pocket Diary and Appointment Book,

FOR

Registering Appointments for Dental Operations.

MONDAY. 19

8		1	
9		2	
10		3	
11		4	
12		5	

TUESDAY. 19

8		1	
9		2	
10		3	
11		4	
12		5	

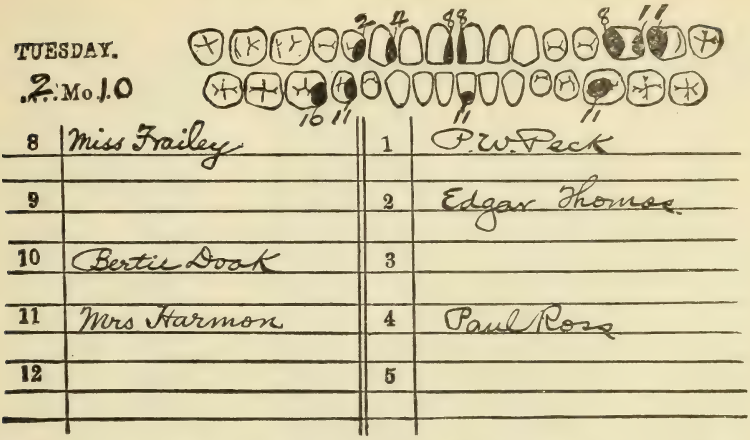
WEDNESDAY. 19

8		1	
9		2	
10		3	
11		4	
12		5	

The Diagram shows the exact size and style of a page of the Pocket Diary, presenting, when open, engagements for one week. The figures denote the hour of the engagement. It contains blanks for 54 weeks, and, being without date, is good for any time. It has also a neat memorandum attached.

Price, Flexible Cover, Gilt Edge.............................$0.55
" " " " " with Pocket and Tuck........ .80

The Diagram Appointment Book.


2 4 8 8 11
10 11 11 11

TUESDAY.
2 Mo 10

8	Miss Frailey	1	P. W. Peck
9		2	Edgar Thomas
10	Bertie Dook	3	
11	Mrs Harmon	4	Paul Ross
12		5	

The feature of this Appointment Book is the facility which it affords of making a brief but clear memorandum of the work to be done for each patient at the time the appointment is made.

For each day there is a diagram of the teeth. As appointments are made, the hour set apart is noted upon the diagram, opposite the tooth or teeth to be treated. When the patient takes his place in the chair, a glance at the diagram shows the operator at once where the work is to begin.

The illustration shows a typical day's markings.

The book is 6¾ x 4¼ inches. In the front are calendars for three years, and a table showing the number of days from any day in one month to the same day in any other month; following this are the appointment pages, a full week's appointments being shown when the book is opened. Back of this are pages for memoranda and blanks for a monthly cash account and yearly summary. Supplied in cloth or leather.

PRICES.

Cloth	$0.30
Leather	.50

Special Bill-Heads.

All our stock Bill-Heads for dentists are printed all over,—that is, the lines are printed in black, the same as the typography. Of course, in using these the dentist has to write or stamp in his own name and address, as well as that of the patient. Those who prefer to have special Bill-Heads, with their own name and address printed on them, can have them made to order. We can supply them with the lines printed, as in the stock Bill-Heads, or ruled in red and blue, at the following prices:

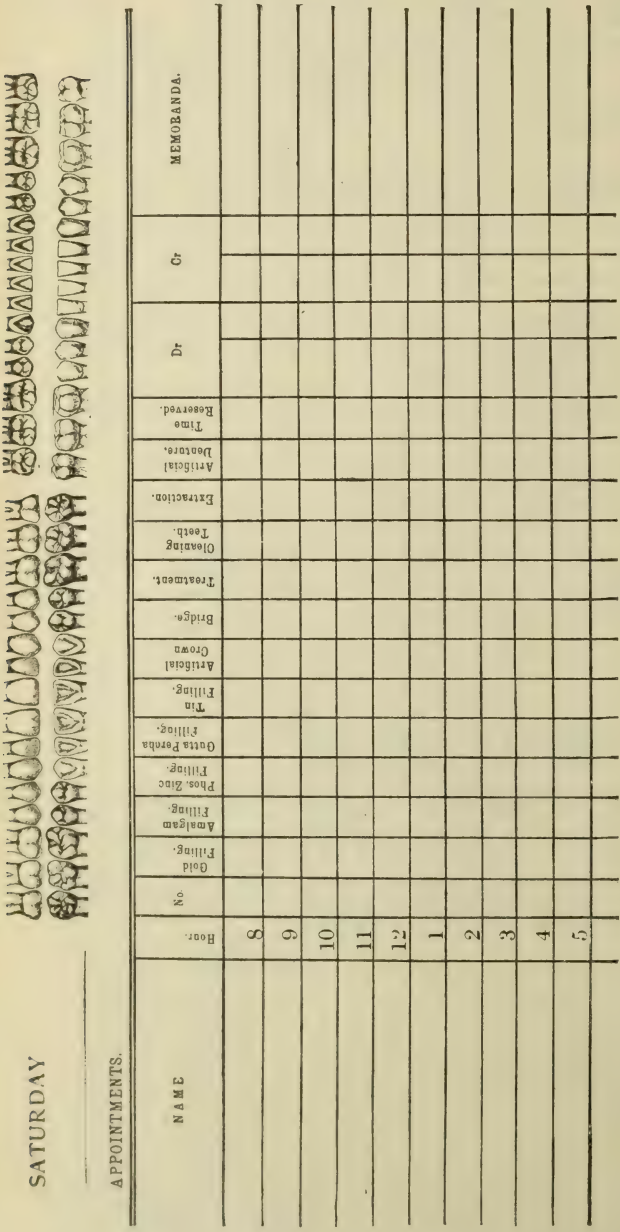
	Printed Lines.	Ruled Lines.
Nos. 1, 3, 4, and 5, one hundred	$2.00	$3.50
" " two "	2.75	4.25
" " three "	3.25	4.75
" " five "	3.75	5.25
" " one thousand	6.00	7.75
No. 2, one hundred	1.90	3.40
" " two "	2.40	3.90
" " three "	2.90	4.40
" " five "	3.40	4.90
" " one thousand	3.90	5.65

You can thus have your own bill-heads, by ordering in quantities, at the same rate if you use Nos. 1, 3, or 4, or at nearly the same rate for No. 2, as the stock Bill-Heads, provided you take them in the same style.

Ruled Bill-Heads cost a little more, but they are decidedly better looking.

THE S. S. WHITE

Dental Appointment Book No. 3.



SATURDAY

APPOINTMENTS.

NAME	Hour.	No.	Gold Filling.	Amalgam Filling.	Phos. Zinc Filling.	Gutta Percha Filling.	Tin Filling.	Artificial Crown	Bridge.	Treatment.	Cleaning Teeth.	Extraction.	Artificial Denture.	Time Reserved.	Dr	Cr	MEMOBANDA.
	8																
	9																
	10																
	11																
	12																
	1																
	2																
	3																
	4																
	5																

In this Appointment Book the unequaled Allan diagram is used. Those especially who use the Warren Dental Ledger, which is founded on the same diagram, will find this Appointment Book a considerable aid in the keeping of their records.

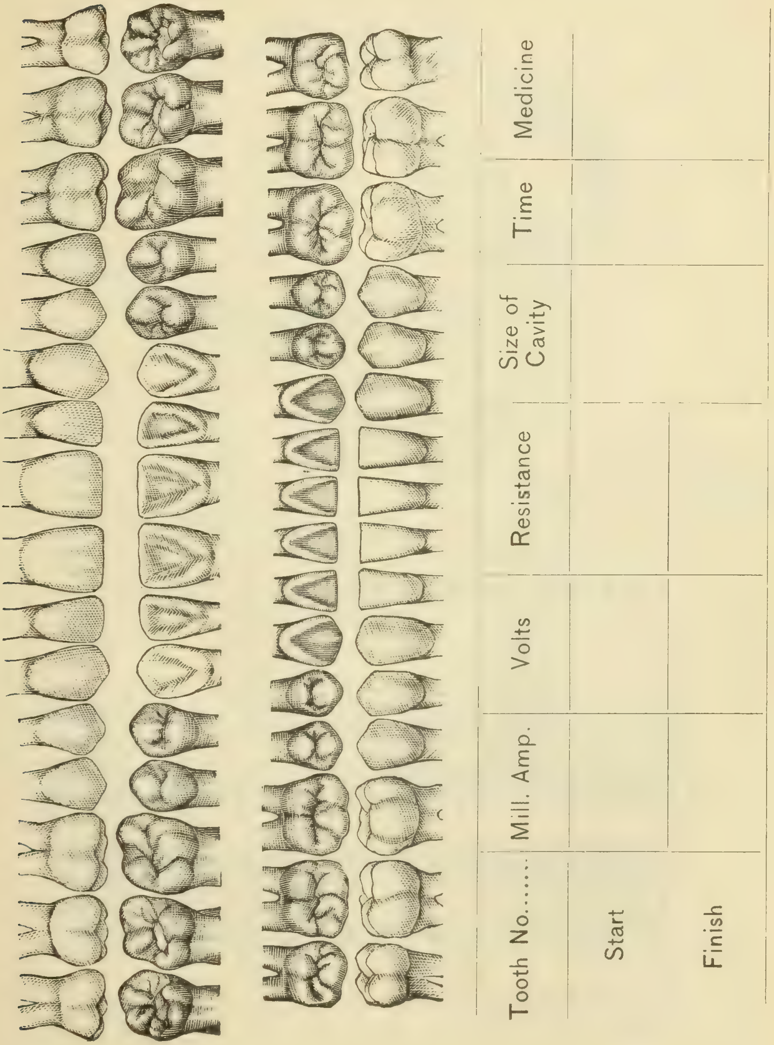
The book is oblong; the pages, of which there are 312, are 5¼ x 9 inches. The diagram is printed in red (natural size), so that marks upon it will be more readily seen. Below the diagram are the spaces for appointments from 8 A.M. to 5 P.M., with headings for all the usual operations, and memorandum space for any special notes. The reduced reproduction of a page herewith gives a clear idea of the advantages of this book.

Printed on good paper, paged and indexed, bound in cloth, with leather back; red edges.

Price.... $1.25

RECORD OF CATAPHORIC OPERATIONS.

Devised by WESTON A. PRICE, D.D.S.



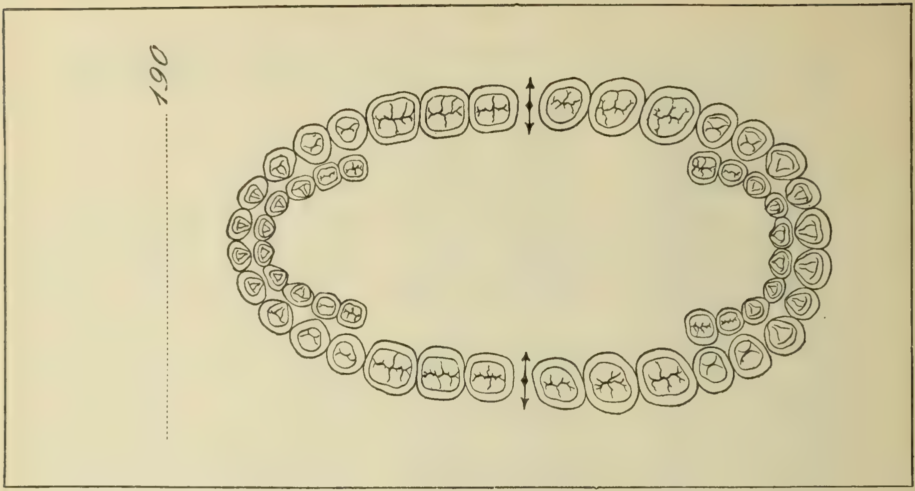
This diagram affords opportunity for a complete record of any cataphoric operation in dentistry. Below the diagram is a space for remarks, and blanks for the name of the patient and date of the operation.

The size of the page is 5½ by 7 inches, the same as the Allan Examination Record.

Put up in books of 100 leaves, paged and indexed, with heavy manilla cover and cloth back.

Price .... each $0.40

MEMORANDUM BLANKS, No. 1.

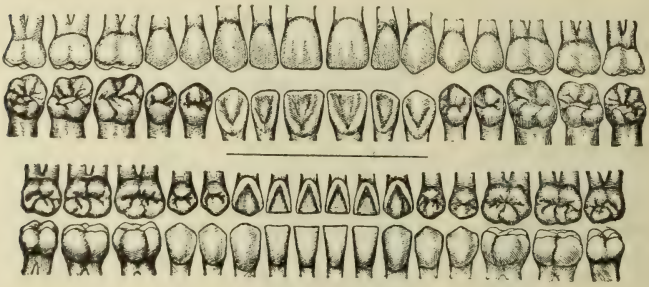


The size and style are shown by the diagram. Plain backs. Size 4⅝ x 2⅜ inches. 100 in a tablet.

Price ....per tablet $0.20

EXAMINATION BLANKS, No. 3.

*Date*______________________________*190*



Examination of M_______________________
teeth.

Remarks:_______________________________

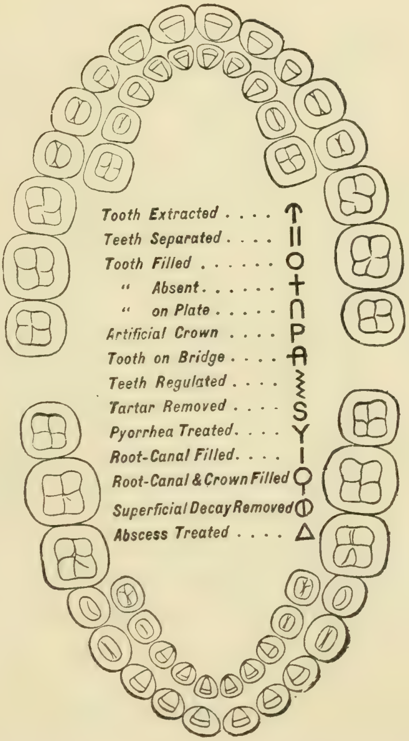
The illustration of the teeth used in the No. 3 Examination Blanks is a reduced facsimile of that in the Improved Warren Dental Ledger. The outlines show the size and style of the blank. Size 3¾ x 3¾ inches.

Put up in tablets of 50. Each blank readily detached without interfering with the others.

Price ....per tablet $0.20

EXAMINATION BLANKS, No. 2.

EXAMINATION.


Tooth Extracted . . . . ↑
Teeth Separated . . . . ||
Tooth Filled . . . . . . O
" Absent. . . . . . +
" on Plate . . . . . ∩
Artificial Crown . . . . P
Tooth on Bridge . . . . A
Teeth Regulated . . . . ≷
Tartar Removed . . . . S
Pyorrhea Treated. . . . Y
Root-Canal Filled. . . . I
Root-Canal & Crown Filled ♀
Superficial Decay Removed ⌽
Abscess Treated . . . . △

....

....

....19

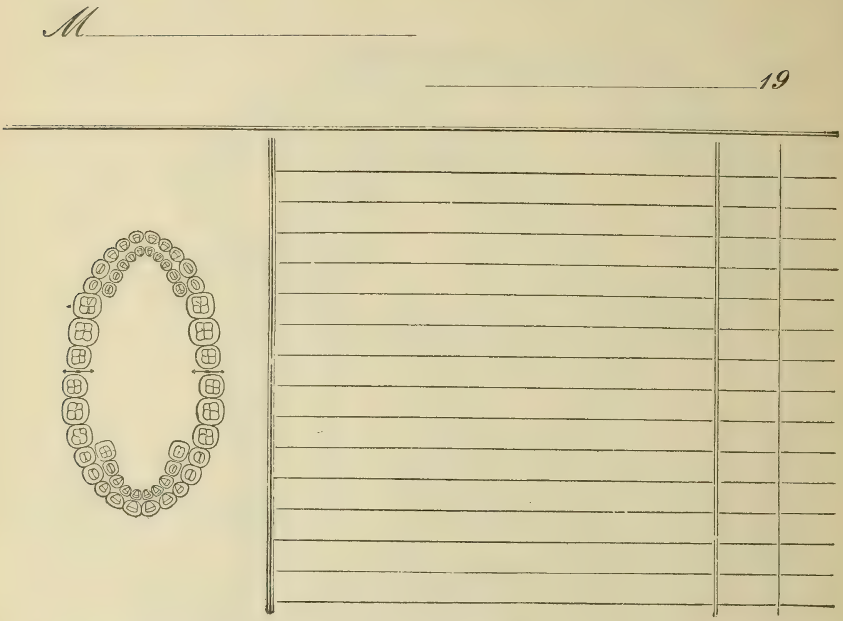
The diagram is a reduction of that used in the Improved Allport Dental Ledger, showing the symbols used to facilitate rapid book-keeping. The reverse side is made up in the form of a memorandum account, whereon any desired entries can be made to be afterward transferred to the Ledger.

Size 5⅜ x 3¾ inches. Put up in tablets of 50 each.

Price ....per tablet $0.20

BILL-HEADS.

No. 1. (Illustration half size.)



M

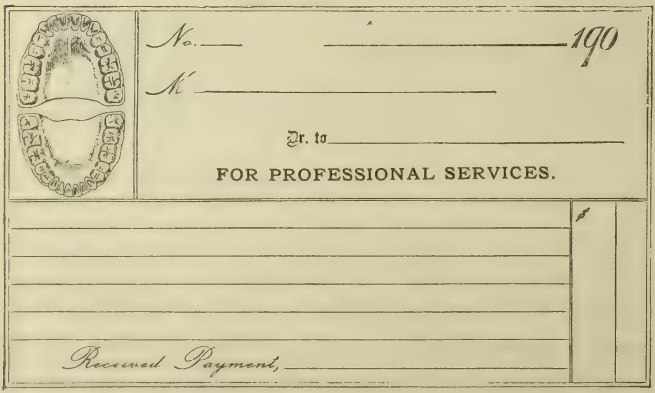
19

One of the oldest forms, with Diagram like that of the old-time Dentists' Account Book, a reduction of that of the original Allport Ledger.

Size 8½ inches wide by 7 inches long. Put up in tablets of 100.

Price .... per tablet $0.60

No. 2. (Illustration half size.)



No. 190

M

Dr. to

FOR PROFESSIONAL SERVICES.

$

Received Payment,

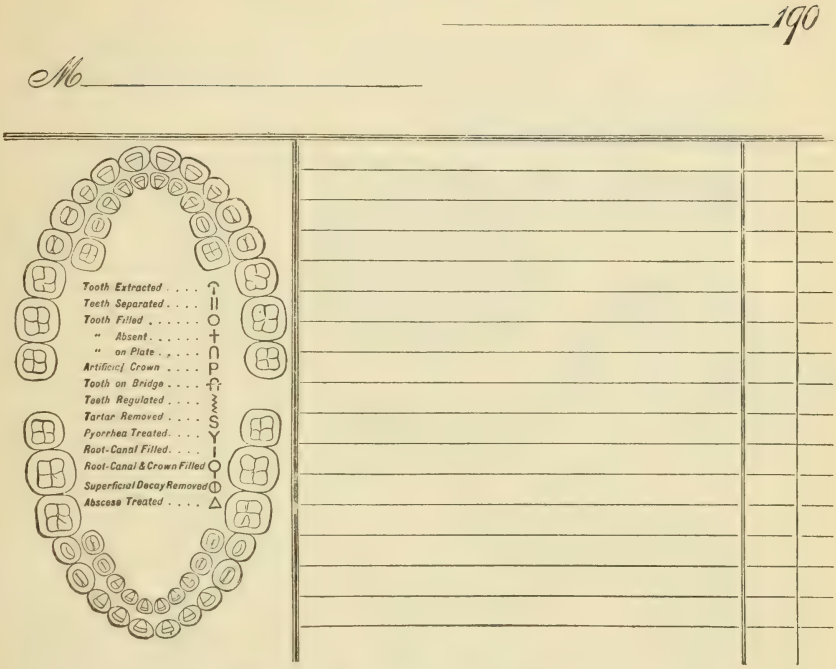
The diagram of the teeth used is that shown in Dental Cut No. 8 (page 61). A neat, small form.

Size 7¼ inches wide by 4¼ inches long. Put up in tablets of 100.

Price .... per tablet $0.30

BILL-HEADS.

No. 3. (Illustration half size.)

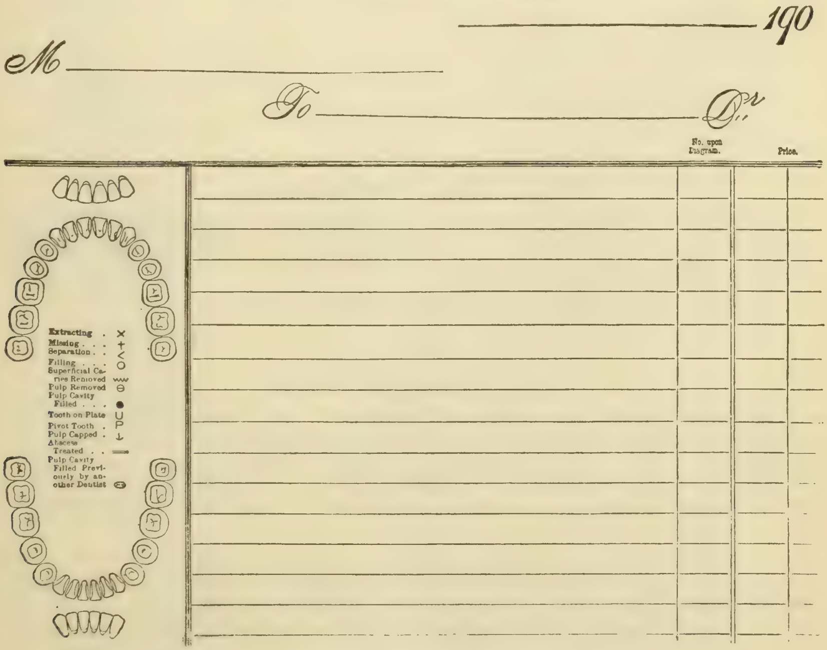


190

M

Tooth Extracted . . . .
Teeth Separated . . . . ||
Tooth Filled . . . . . . O
" Absent . . . . . . +
" on Plate . . . . . ∩
Artificial Crown . . . . P
Tooth on Bridge . . . .
Teeth Regulated . . . . ≷
Tartar Removed . . . . S
Pyorrhea Treated. . . . Y
Root-Canal Filled. . . . I
Root-Canal & Crown Filled
Superficial Decay Removed ⦶
Abscese Treated . . . . △

No. 4. (Illustration half size.)



190

M

To Dr.

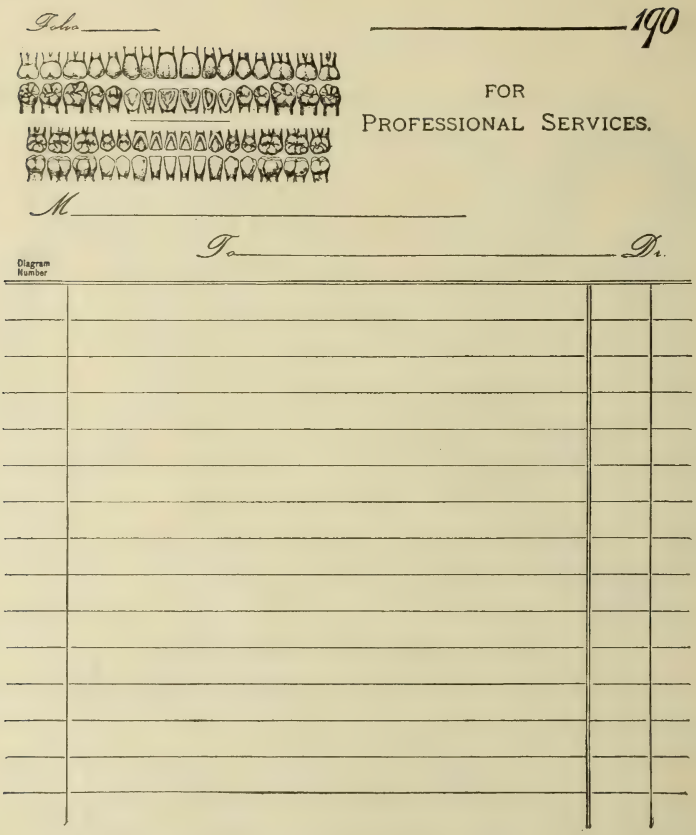
No. upon Diagram.

Price.

For prices and description see following page.

BILL-HEADS.

No. 5. (Illustration half size.)



Folio

190

FOR

PROFESSIONAL SERVICES.

M

To Dr.

Diagram Number

No. 3. (See preceding page.)

Diagram of the teeth (deciduous and permanent) exactly like that of the Allport Improved Dental Ledger, which it was designed to accompany. Symbols shown on the Bill-Head.

Size 8½ inches wide by 7 inches long. Put up in tablets of 100.

Price..per tablet $0.60

No. 4. (See preceding page.)

Originally designed as a companion piece to the Pettit System of dental account books, and containing the well-known diagram and symbols.

Size 8½ inches wide by 7 inches long. Put up in tablets of 100.

Price..per tablet $0.60

No. 5.

Designed for use with the Improved Warren Dental Ledger. Diagram a reduced facsimile, same as that shown in Examination Blank No. 3.

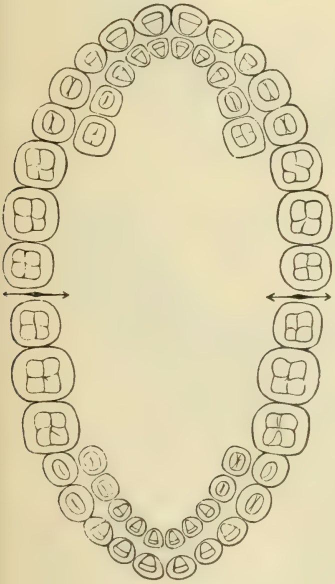
Size 7 inches wide by 8½ inches long. Put up in tablets of 100.

Price..per tablet $0.60

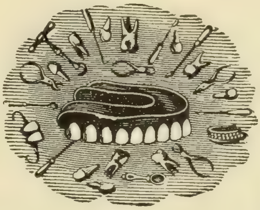
ELECTROTYPE DENTAL CUTS.

Cuts for advertisements and business cards. They are the exact height of type, and can be furnished at the prices quoted below. Nos. 1, and 8 to 13, are mounted on wood. All the others on metal.

No. 1.

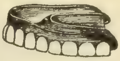


No. 2.

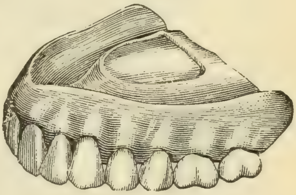


No. 3.

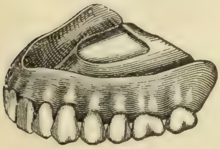
No. 4.



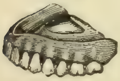
No. 5.



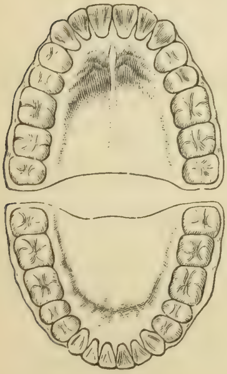
No. 6.



No. 7.



No. 8.



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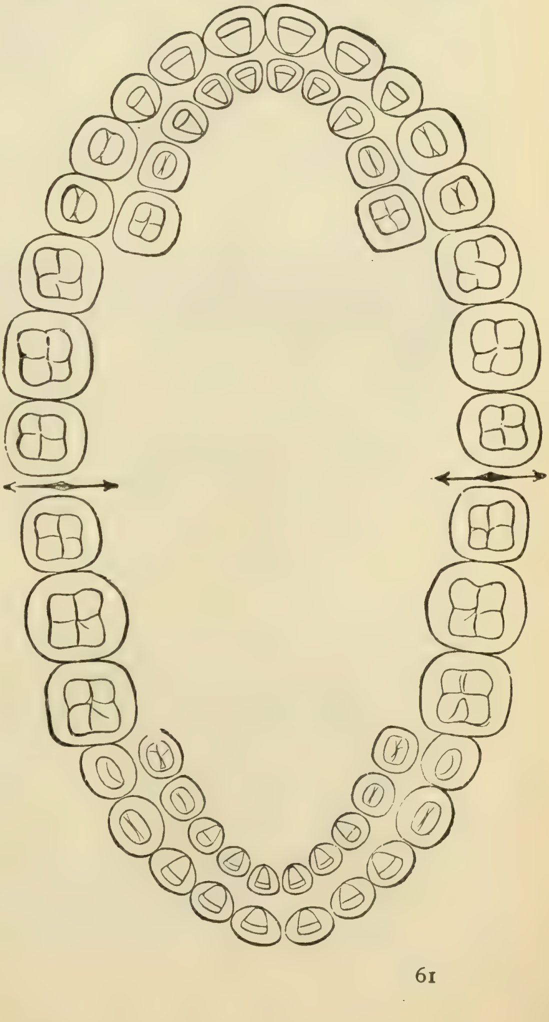

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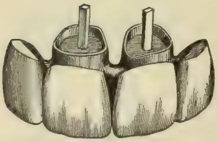

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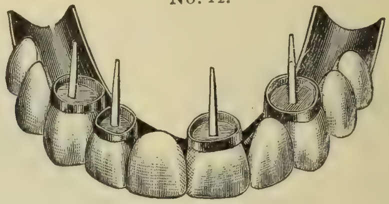

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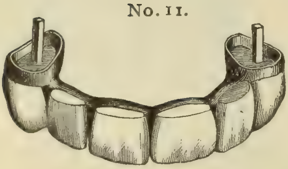

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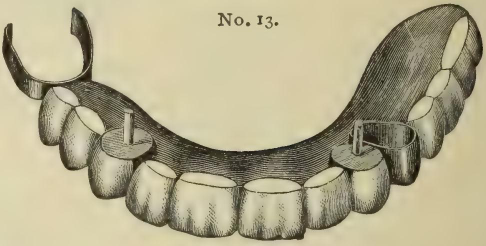

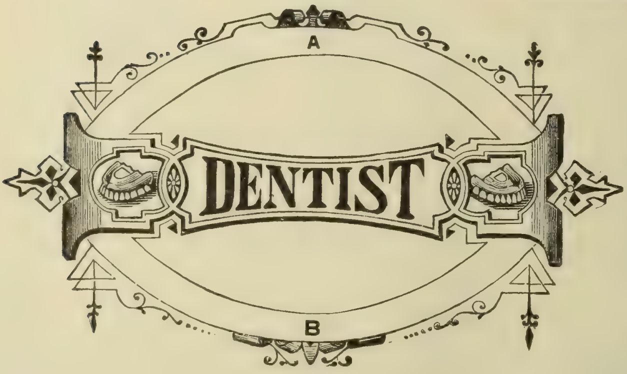

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N. B.—Special attention is called to the rule adopted by the National Association of Dental Faculties, August, 1895, requiring all applicants for matriculation to be present and enter their names not later than the tenth of October. This rule applies equally to students entering the second and third year classes.

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The Dental Department of the University is an integral part of the University system. Its students at the discretion of the Dean are permitted to take courses of instruction in other departments of the University without additional fees, and are eligible to and participate in all those features of University life common to the whole student body of the institution. These include its athletic features and privileges of the Howard Houston Hall, the club house of an organization governed by the University students and having all of the appointments and desirable features of a strictly first-class club. The dormitories of the University are the best of their kind in this country, and to these the students of dentistry are admitted in common with the students of all the other departments.

The Regular or Winter Session.

The session begins October 1, and ends at Commencement, early in June. The number of lectures per week, with a synopsis of the various branches taught, will be found in the General Catalogue.

In order to facilitate work in the practical departments, the regular winter session is so arranged that the first-course student is required to divide the morning hours equally between DENTAL TECHNICS, HISTOLOGICAL, AND CHEMICAL LABORATORY WORK.

During the second and third years the student has the entire forenoon of each day for practical dental work. Ample opportunity is thus afforded for practice in operative and prosthetic dentistry. The first-year classes are divided into sections, the time not otherwise engaged being devoted to practice in the operative and mechanical rooms.

This plan of GRADING THE COURSE, and of affording the first and second year students an opportunity of coming forward for examination in certain branches, not only proves an economical arrangement of their time, but greatly facilitates their labors in the acquirement of knowledge in the remaining branches.

Plan of Examination.

Attendance upon three regular courses of lectures will be required before the student can take the final examination for the degree of Doctor of Dental Surgery.

At the close of the first year, final examinations are held in CHEMISTRY AND MATERIA MEDICA, ELEMENTARY ANATOMY, HISTOLOGY, OSTEOLOGY, and MYOLOGY, and in PHYSIOLOGY excepting the Muscular and Nervous Systems. At the end of the second year the student is examined finally upon ANATOMY and PHYSIOLOGY; and progress in OPERATIVE AND MECHANICAL DENTISTRY; if he is not qualified, a second examination is afforded him at the beginning of the next winter session.

The final examination at the close of the third year is in OPERATIVE DENTISTRY, MECHANICAL DENTISTRY, METALLURGY, BACTERIOLOGY, CLINICAL DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND ORAL SURGERY.

All applicants for advanced standing must pass the required examinations of this school, or furnish proof that they have passed EQUIVALENT examinations in some recognized dental or medical school. Graduates of a recognized medical college will be admitted to the second-year class without examination.

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The instruction in both operative and mechanical dentistry is as thorough as it is possible to make it, and embraces everything pertaining to dental art. The advantages which the general and oral surgical clinics to which the dental students are admitted, as indeed to all the lectures of the University, afford, cannot be overestimated. The many thousands of patients annually treated in the University Hospital, well known to be the largest Hospital in Baltimore, afford an abundance of material for dental infirmary and laboratory practice, and the oral surgery clinics.

The Infirmary and Laboratory practice for students is exceptionally large, a fact that adds so greatly to the facilities of this Dental School.

The Dental Infirmary and Laboratory Building is one of the largest and most complete structures of the kind in the world. The Infirmary is lighted by forty-seven large windows, and is furnished with the most improved operating chairs. It has again become necessary to enlarge the Dental Building, making an Infirmary nearly one hundred feet long, and a Laboratory eighty feet long and forty-three feet wide.

The Dental Infirmary and Laboratory are open daily (except Sunday) during the entire year for the reception of patients; and THE PRACTICE OF DENTAL STUDENTS has increased to such an extent that all the students during the past season have had an abundance of practical work in both operative and prosthetic dentistry. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions. The exceedingly large number of patients for the extraction of teeth affords ample facilities for practical experience to every student.

In addition to the facilities afforded by this institution for a thorough course of instruction in the theory and practice of dentistry, the clinics in the University Hospital enable the Dental equal with the Medical Students to become familiar with the diseases and operations of Practical Surgery. Excisions of jaw, partial or entire; tumors, cancerous or benign, of various parts of the buccal cavity; plastic operations for restoration of cheek, lips, etc., may be mentioned as having been before the class during the year. The induction of anesthesia by means of different agents—ether, chloroform, bromide of ethyl, nitrous oxid gas, all being used in the clinics—cannot fail to be of use to the student of Oral Surgery. Junior as well as Senior students are afforded every opportunity for practical instruction in both operative and mechanical dentistry.

The Lecture Halls in the University Buildings are large and well lighted; and every facility will be afforded for practical and theoretical dental instruction. Demonstrations in Anatomy, Physiology, and Pathology (for which an abundance of material is furnished free of charge) also form an important part of the regular course. The Dissecting Room is large, well ventilated and lighted, and the Demonstrator of Practical Anatomy passes much of his time assisting the students and directing their labors. Dissecting Material is furnished in abundance, free of charge.

The Qualifications for admission and Graduation are those adopted by the National Association of Dental Faculties and the State Dental Examining Boards. The Diplomas of this School are recognized by all State Dental Examining Boards.

Qualifications for Graduation: The candidate must have attended three full courses of lectures of seven months each in different years at the Regular or Winter Sessions in this institution. As equivalent to one of these, one course in any reputable dental college will be accepted. Graduates of medicine can enter the Junior Class; also those who have attended one full medical course. The matriculant must have a good English education; a diploma from a reputable literary institution, or other evidence of literary qualifications will be received instead of a preliminary examination. All students, both juniors and seniors, have equal advantage in operative and mechanical dentistry in this institution throughout every session.

Graduation in Medicine: Graduates of the Dental Department of the University of Maryland are required to meet the requirements as specified in the annual Catalogue, prior to presenting themselves as candidates for the degree of "Doctor of Medicine."

The Regular or Winter Session will begin on the 1st day of October, and will terminate in April of each year.

The Summer Session, for practical instruction, will commence in May, and continue until the Regular Session begins. Students in attendance on the Summer Session will have the advantage of all the daily Surgical and Medical Clinics of the University.

The fees for the Regular Session are $100, Demonstrators' fees included; Matriculation Fee, $5; Diploma Fee, for candidates for graduation, $30; Dissecting Ticket, $10.

For Summer Session, no charge to those who attend the following Winter Session.

Board can be obtained at from $3.50 to $5.00 per week, according to quality.

The University Prize and a number of other Prizes will be specified in the annual Catalogue.

Students desiring information and the annual Catalogue will be careful to give full address and direct their letters to

F. J. S. GORGAS, M.D., D.D.S.,

Dean of the Dental Department of the University of Maryland,

845 N. Eutaw Street, Baltimore, Md.

Haskell School
OF
Prosthetic Dentistry.

Dr. G. A. YANT, President.

STEINWAY HALL, 17 E. VANBUREN ST., CHICAGO, ILL.,

Will reopen November 1. Write for circular of information.

This school also gives a course for those wishing to fit themselves for Prosthetic Dentistry only.

Term six to eight months.

Address

Dr. E. J. WARD, Secretary,

103 State Street, Chicago, Ill.

New York Dental School.

AN INSTITUTION OF THE

University of the State of New York.

CO-EDUCATIONAL.

Member of the National Association of Dental Faculties.

The Session of 1900–1901 begins October 9.

(LAST DAY OF MATRICULATION OCTOBER 19.)

New and Commodious quarters in the heart of the City, with superior Infirmary facilities for practice.

This College, denominated School, under the present laws of the State of New York, and coming under the head of Profession and Technical Schools, was incorporated in June, 1892. It has now reached its eighth annual course. The gradual growth from its beginning has been the history of all new organizations of its kind. It now stands upon a substantial foundation, comprising all the necessary implements and paraphernalia for the teaching of dentistry, but at the same time giving the *dental student* a *medical* training except in the strictly dental branches.

Practical post-graduate instruction in operative and prosthetic dentistry will be given in the infirmary throughout the year.

With regard to INFIRMARY we strive to meet the demands of both student and State in supplying just enough material for the wants of the students and not to pauperize the public by making what is usually called a clinic.

The Diploma given by the New York Dental School is issued by the University of the State at Albany, only by permission of the New York Dental School to the State Board of Regents, which is the University of the State of New York.

For catalogue and further information, address

CHAS. MILTON FORD, M.D., Dean,
218 W. 135th St., New York City.

Pennsylvania College of Dental Surgery.

Eleventh Street, below Spruce, corner of Clinton St.

FORTY-FIFTH ANNUAL SESSION, 1900-1901.

FACULTY.

C. N. PEIRCE, D.D.S., Professor of Principles and Practice of Operative Dentistry.
WILBUR F. LITCH, M.D., D.D.S., Professor of Materia Medica, Therapeutics, and Principles of Prosthetic Dentistry.
ALBERT P. BRUBAKER, M.D., D.D.S., Professor of Physiology, General Pathology, and Bacteriology.
I. NORMAN BROOMELL, D.D.S., Professor of Dental Anatomy, Dental Histology, and Prosthetic Technics.
GEORGE W. WARREN, A.M., D.D.S., Professor of Clinical Dentistry and Oral Pathology.
PERCIVAL E. LODER, M.D., D.D.S., Professor of Anatomy.
W. J. ROE, M.D., D.D.S., Professor of Surgical Pathology and Oral Surgery.
J. BIRD MOYER, B.S., Ph.D., Professor of Chemistry and Metallurgy.

AUXILIARY INSTRUCTORS—Instructors in Operative Dentistry.

E. ROLAND HEARN, D.D.S., Chief Instructor.
JOHN A. MORAN, D.D.S.
LOUIS BRITTON, D.D.S.
J. W. ADAMS, D.D.S.
W. K. THORPE, D.D.S.
WILLIAM A. BLACKBURN, D.D.S.

Instructors in Prosthetic Dentistry.

RUPERT G. BEALE, D.D.S.
FREDERICK R. BRUNET, D.D.S.
W. T. HERBST, D.D.S.
J. CLARENCE SALVIS, D.D.S.
FRANK S. HALL, D.D.S.
E. A. KRETSCHMAN.
EDWARD WAYNE, D.D.S., Instructor in Chemistry.
E. E. HUBER, D.D.S., Instructor in Metallurgy.
A. GRANT LODER, A.M., M.D., Instructor in Anatomy.
GEORGE VARWIG, D.D.S., Assistant.

Special.

CHARLES S. HEARN, M.D., Instructor in Histology and Microscopy.
WILLIAM B. WARREN, D.D.S., Instructor in Crown- and Bridge-Work.
GEO. C. BRYANT, D.D.S., Instructor in Dental Ceramics.
F. P. RUTHERFORD, Ph.G., D.D.S., Instructor in Bacteriology, Pharmacology, etc.
RUPERT G. BEALE, D.D.S., Instructor in Appliances for Cleft-Palate Deformities and Maxillary Fractures.
A. W. STRECKER, D.D.S., Instructor in Dental Histology.
CHARLES P. SHOEMAKER, D.D.S., Instructor in Modeling.

Clinical Assistants.

Chair of Anatomy.	Chair Oral Surgery.
W. J. GRIFFIN.	J. M. DANNEKER, D.D.S.
J. B. ZELLER.	W. R. ROE, D.D.S.

Clinical Instructors.

Dr. J. N. FARRAR,
Dr. W. G. A. BONWILL,
Dr. A. L. NORTHRUP,
Dr. C. S. STOCKTON,
Dr. C. E. FRANCIS,
Dr. A. H. BROCKWAY,
Dr. C. PALMER,
Dr. CHAS. F. BONSALL,
Dr. T. F. CHUPEIN,
Dr. W. R. MILLARD,
Dr. W. H. TRUEMAN,
Dr. R. HOLLENBACK,
Dr. A. B. ABELL,
Dr. H. NEWTON YOUNG,
Dr. J. HOWARD GASKILL,
Dr. MARY H. STILWELL,
Dr. G. L. S. JAMESON,
Dr. H. C. REGISTER.

This College has accepted the requirements of the National Association of Dental Faculties with regard to admission and graduation of students. (See announcement for 1900-1901.)

Fall Session.

THE FALL COURSE will commence September 10, and continue until the 1st of October and will be free to those who matriculate for the regular session.

The Regular Session

Will commence on October 1, 1900, and continue until May 1, 1901.

Clinical Practice.

Lecture hours excepted, general clinical practice is available for the student continuously through the day. Competent instructors are always present.

Graduation in Medicine.

By an arrangement with Jefferson Medical College, such students as may desire to do so can, if found qualified, obtain the two degrees, in Dentistry and Medicine, in five years.

FEES.

Matriculation (paid but once)	$5.00
For each year	100.00
Dissecting Fee	10.00
Diploma Fee	30.00

Board can be obtained at from $4.00 to $6.00 per week.

The instruments and tools required can be procured for from $35.00 to $45.00. This sum does not include the price of dental engine.

For further information, address

WILBUR F. LITCH, M.D., D.D.S., Dean, 1507 Walnut St., Philada.
GEO. W. WARREN, A.M., D.D.S., Secretary, 1338 Walnut St., Philada.

New York College of Dentistry.

Incorporated by the Legislature of the State of New York in 1865.

THIRTY-FIFTH COLLEGIATE YEAR.

The collegiate year work of 1900-1901 will consist of a FREE Infirmary Course (OPTIONAL) of daily infirmary practice, from May 15, 1900, to October 1, 1900, to students matriculated for the collegiate year; and a Lecture Session (OBLIGATORY) of lectures, practical classes in sections and daily infirmary practice, from October 1, 1900, to about May 15, 1901.

A special feature of the curriculum of the New York College of Dentistry is that students work, *daily*, in the Infirmary, for the entire period of their college attendance—first, second, and third year—under the direction of the superintendents and demonstrators of the Infirmary.

Registration for the Lecture Session of 1900–1901 closes October 10, 1900.

Applicants will be admitted to the Lecture Session of 1900-1901 as DEGREE, SPECIAL, or SESSION STUDENTS.

1. DEGREE STUDENTS.

Those matriculating toward the degree of D.D.S. under the following preliminary educational requirements:

a. For those who were matriculated in a registered dental or medical college prior to January 1, 1896, no preliminary educational conditions will be required, either for the degree of the college or the license examination of the state of New York.

b. For those who were matriculated in a registered dental or medical college between January 1, 1896, and January 1, 1897, a certificate of two years of high school attendance or their equivalent in credentials from schools registered by the Regents or pass cards for 24 academic counts obtained by Regents' examinations.

c. For those matriculated between January 1, 1897, and January 1, 1900, a certificate of three years of high school attendance or their equivalent in credentials from schools registered by the Regents or pass-cards for 36 academic counts obtained by Regents' examinations.

d. Special attention is called to the fact, that there will be required of those not matriculated before January 1, 1901, a certificate of four years high school attendance or their equivalent from schools registered by the Regents or pass-cards for 48 academic counts obtained by Regents' examinations.

A graduate of a dental college *out* of the state of New York is not admitted to the dental license examination of the state of New York unless he has fulfilled the preliminary educational requirements of a "Degree Student.

2. SPECIAL STUDENTS.

Those who, without any preliminary educational requirements, matriculate, but not toward the degree, and attend the Infirmary practice, with lecture attendance FREE, pending their securing, by Regents' examinations, the preliminary educational requirements to become a "Degree Student," with their "Special Student" period credited as pupilage only. On the date of their obtaining 24 counts they become "Degree Students."

3. SESSION STUDENTS.

Those who hold credentials of preliminary education equivalent to "a certificate of entrance into the second year of a high school," matriculate for their first or first and second lecture sessions, but not toward the degree, pay the fees and are eligible to the examinations and certificates of the sessions. The certificates of the session or sessions will admit them to advance standing toward the degree in dental colleges OUT OF THE STATE belonging to the National Association of Dental Faculties.

For full details of the college send for an announcement of 1900-1901 and a copy of "Form I," addressing.

FANEUIL D. WEISSE, M.D., Dean,
205-207 East 23d Street,
NEW YORK, N. Y.

ESTABLISHED 1845.

Ohio College of Dental Surgery.

DEPARTMENT OF DENTISTRY—UNIVERSITY OF CINCINNATI.

Session 1900-1901.

FACULTY.

J. S. CASSIDY, A.M., M.D., D.D.S., Professor of Chemistry and Materia Medica.
H. A. SMITH, A.M., D.D.S., DEAN OF THE FACULTY, Professor of Operative Dentistry and Dental Pathology.
C. M. WRIGHT, A.M., D.D.S., Professor of Physiological and General Pathology.
WM. KNIGHT, M.D., D.D.S., Professor of Anatomy and Oral Surgery.
GRANT MOLYNEAUX, D.D.S., Professor of Prosthetic Dentistry and Metallurgy.
H. T. SMITH, D.D.S., Professor of Clinical Operative Dentistry and Orthodontia.
T. I. WAY, D.D.S., Professor of Dental Technics.

J. TAFT, M.D., D.D.S., Lecturer on Oral Hygiene.
C. I. KEELY, D.D.S., Lecturer on Orthodontia.
L. E. CUSTER, D.D.S., Lecturer on Anesthetics and Dental Electricity.
O. L. CAMERON, Lecturer on Bacteriology.

DEMONSTRATORS.

T. I. WAY, D.D.S., Superintendent of Clinics and of Instruction in Dental Technics.
E. A. MEHAFFEY, D.D.S., Demonstrator of Crown- and Bridge-Work and Operative Dentistry.
C. P. McLAUGHLIN, D.D.S., Demonstrator of Operative Dentistry.
C. A. PORTER, D.D.S., Demonstrator of Orthodontia and Instructor in the Extraction of Teeth.
C. F. COOPER, D.D.S., Demonstrator of Prosthetic Dentistry and Instructor in Prosthetic Technics.
R. W. TAYLOR, D.D.S., Demonstrator of Prosthetic Dentistry.
H. C. MATLACK, D.D.S., Consulting Oral Surgeon Cincinnati Hospital. Demonstrator of Anatomy.
DAVID STERN, B.S., D.D.S., Demonstrator of Analytical Chemistry.
GEO. T. FETTE, B.A., D.D.S., Assistant Instructor in Histology.

The Fifty-fifth Annual Session begins October 9, 1900, and closes May 9, 1901.
A Spring Course of Clinical Instruction begins May 9, 1901.
A Fall Course of Clinical Instruction begins September 1, 1900.

For further information and announcement, address

H. A. SMITH, D.D.S., Dean,
or H. T. SMITH, D.D.S., Secretary,
116 Garfield Place, CINCINNATI, O.

Harvard University, Dental Department.

BOSTON, MASS., 1900-1901.

FACULTY.

CHARLES W. ELIOT, LL.D., President.
EUGENE H. SMITH, D.M.D., Dean, and Professor of Mechanical Dentistry and Orthodontia.
J. COLLINS WARREN, M.D., Professor of Surgery.
HENRY P. BOWDITCH, M.D., Professor of Physiology.
THOMAS DWIGHT, M.D., Professor of Anatomy.
THOMAS FILLEBROWN, M.D., D.M.D., Professor of Operative Dentistry and Oral Surgery.
WILLIAM B. HILLS, M.D., Assistant Professor of Chemistry.
CHARLES S. MINOT, S.D., Professor of Histology.
HAROLD C. ERNST, M.D., Professor of Bacteriology.
CHARLES A. BRACKETT, D.M.D., Professor of Dental Pathology.
EDWARD C. BRIGGS, M.D., D.M.D., Professor of Materia Medica and Therapeutics.
JERE E. STANTON, M.D., D.M.D., Assistant Professor in Oral Anatomy, Physiology, and Bacteriology.
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FRANKLIN DEXTER, M.D., Assistant Professor of Anatomy.
WILLIAM H. POTTER, D.M.D., Lecturer in Operative Dentistry.

OTHER INSTRUCTORS.

FOREST G. EDDY, D.M.D., Instructor in Operative Dentistry.
GEORGE H. MONKS, M.D., Instructor in Surgical Pathology.
EDWARD W. TAYLOR, M.D., Instructor in Neurology.
EZRA F. TAFT, D.M.D., Instructor in Operative Dentistry.
JULIUS G. W. WERNER, D.M.D., Clinical Instructor in Operative Dentistry.
DWIGHT M. CLAPP, D.M.D., Clinical Lecturer in Operative Dentistry.
EDWIN C. BLAISDELL, D.M.D., Instructor in Operative Dentistry.
WALDO E. BOARDMAN, D.M.D., Instructor in Operative Dentistry, Curator of Museum, and Librarian.
FREDERICK BRADLEY, D.M.D., Instructor in Operative Dentistry.
HENRY L. UPHAM, D.M.D., Instructor in Operative Dentistry.
ARTHUR H. STODDARD, D.M.D., Clinical Lecturer in Mechanical Dentistry.
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HARRY O. BIXBY, D.M.D., Instructor in Mechanical Dentistry.
ARTHUR W. ELDRED, D.M.D., Instructor in Mechanical Dentistry.
ROBERT J. McMEEKIN, D.M.D., Demonstrator of Operative Dentistry.
NATHAN P. WYLLIE, D.M.D., Instructor in Materia Medica and Anesthesia.
ALLEN S. BURNHAM, D.M.D., Instructor in Mechanical Dentistry.
THOMAS B. HAYDEN, D.M.D., Instructor in Mechanical Dentistry.
WALTER H. WHITE, D.M.D., Assistant Demonstrator of Operative Dentistry.
DWIGHT WARD DICKINSON, D.M.D., Instructor in Operative Dentistry.
EDWIN L. FARRINGTON, D.M.D., Assistant Demonstrator of Operative Dentistry
ASHER H. St. C. CHASE, D.M.D., Assistant Demonstrator of Mechanical Dentistry.
FREDERICK E. MEADER, D.M.D., Instructor in Mechanical Dentistry.
HARRY W. HALEY, D.M.D., Instructor in Mechanical Dentistry.
HAROLD DeWITT CROSS, D.M.D., Instructor in Mechanical Dentistry.
HENRY C. SMITH, A.B., Instructor in Chemistry.
JOHN DANA DICKINSON, D.M.D., Clinical Instructor in Mechanical Dentistry.
GEORGE L. FORREST, D.M.D., Instructor in Mechanical Dentistry.
ELLIS P. HOLMES, D.M.D., Instructor in Operative Dentistry.
CHARLES E. PERKINS, D.M.D., Instructor in Operative Dentistry.
GEORGE RUFUS GRAY, D.D.S., D.M.D., Instructor in Operative Dentistry.
JOSEPH T. PAUL, D.M.D., Instructor in Operative Dentistry.
FRANK T. TAYLOR, D.M.D., Instructor in Operative Dentistry.
FRANCIS H. HARDING, D.M.D., Instructor in Operative Dentistry.

The Thirty-second Annual Session of this school begins September 27, 1900, and ends June 27, 1901, with a recess of one week at Christmas, and another in April, making a school-year of nine months of practically continuous work.

General Anatomy, Physiology, General Chemistry, Physiological Chemistry, Hygiene, Histology and Embryology, and Bacteriology, together with ample dissecting under able demonstrators, are the studies of the first year. The studies for the second year are Operative and Mechanical Dentistry and Orthodontia, Crown- and Bridge-Work and Metallurgy, Materia Medica and Therapeutics, Oral Anatomy and Physiology, and Bacteriology, Dental Pathology, and Oral Surgery. Of the third year the studies are Operative and Mechanical Dentistry and Orthodontia, Crown- and Bridge-Work, and Metallurgy. Neurology and Surgical Pathology and Surgery. Attention is called to the fact that TWENTY-SEVEN MONTHS of progressive instruction compose the required three years in the school.

All applicants for advanced standing must pass the examination of the years they desire to omit, or furnish proof that they have passed EQUIVALENT examinations.

The University Degree, D.M.D. (Dentariæ Medicinæ Doctor), is conferred upon all who fulfill the requirements.

Graduates of recognized dental schools will be admitted to the course of Operative and Mechanical Dentistry on payment of $50 each, or $100 for both, for the whole or any portion of the academic year.

FEES.

There are no fees for matriculation, nor for the diploma, nor for the demonstrators. For the first year the student is a member of the school the fee is $200, payable in two instalments of $120 and $80; for the second year, $150, in two payments of $100 and $50: for the third year, $150, in two payments of $100 and $50. For any subsequent year, $50, payable at the beginning of the year. For information and announcement, address

EUGENE H. SMITH, Dean, 283 Dartmouth St., Boston, Mass.

Washington Dental College

AND

HOSPITAL OF ORAL SURGERY.

Session of 1900-1901.

No. 625 MASSACHUSETTS AVENUE, NORTHWEST,

Washington, D. C.

FACULTY.

W. WARRINGTON EVANS, M.D., D.D.S., President, Professor of Oral Prosthesis.
AUG. WILSON SWEENY, D.D.S., Professor of Operative Dentistry.
JESSE RAMSBURGH, A.M., M.D., Professor of Oral Surgery and Pathology.
EDWIN R. HODGE, M.D., Professor of General and Dental Anatomy.
W. M. BARTON, M.D., Professor of Materia Medica and Anesthesia.
MONTE GRIFFITH, M.D., Professor of Physiology and Hygiene.
CHAS. E. FERGUSON, M.D., Professor of Chemistry and Metallurgy.
WM. N. COGAN, A.M., D.D.S., Professor of Dental Technics and Orthodontia.
LOUIS A. WALKER, M.D., Professor of Bacteriology and Microscopy.
JOS. WALL, M.D., Adjunct Professor of Anatomy and Histology, and Demonstrator of Practical Anatomy.

With a select Board of Special Lecturers and Clinical Operators.

The regular session of this College will begin October 2, 1900, and terminate in May, 1901.

EDUCATIONAL CENTER AND LOCATION.

Washington as an educational center is becoming well known all over the world, being the Capital of a vast nation, centrally located, the great government wheel vibrating through the winter season, the headquarters of the Legations of all the foreign governments, etc., making it politically and socially, as well as educationally, the most attractive city in the world.

The Government Museums and Libraries are unrivaled. The Medical Museum and Library affords special advantages to the dental student found in no other city. It contains a dental department both in the Museum and Library, the latter possessing the largest and best collection of dental works in the world, while the Government permits the use of text books free of cost. The new Carnegie Free Library will be located within one square of this College. The College itself is central, yet quietly located. The three principal trunk lines of rapid transit street cars are all within two squares of the College, one line passing the door. The building is well adapted for its purpose; is new and modern throughout, with large laboratories for dental, chemical, microscopical, bacteriological, histological, and other work, together with large, well-lighted clinic and lecture rooms, and every other desired convenience. The Department of Oral Surgery will be a special feature, under the manipulative skill of the Oral Surgeon.

QUALIFICATIONS FOR ADMISSION.

This College conforms to the rules and conditions of the National Association of Dental Faculties, also the National Association of Dental Examiners.

PRIZES.—Three College Prizes are awarded each year for proficiency in practical work and studies to successful candidates.

FEES.—Tuition fee is $100 per year, with no extras.

The preliminary entrance examination will be held at the College Friday evening, September 28, 1900, at 7.30 o'clock.

Washington, owing to its numerous boarding houses and hotels, presents facilities for obtaining excellent board and room, varying in rate of charge from $3.00 per week upward.

Students should call upon the Secretary immediately upon arriving in the city.

For general announcement and further information please address

DR. W. W. EVANS, President, 1756 M Street, N. W.

DR. W. N. COGAN, Secretary, 1754 M Street, N. W.

Tufts College Dental School

Formerly BOSTON DENTAL COLLEGE,

For Men and Women. **Boston, Mass.**

FACULTY.

ELMER H. CAPEN, D.D., LL.D., President.

HAROLD WILLIAMS, A.B., M.D.,
Dean, and Professor of the Principles and Practice of Medicine.

CHARLES P. THAYER, A.M., M.D.,
Secretary, and Professor of Anatomy.

EDWARD W. BRANIGAN, D.D.S.,
Professor of Clinical Dentistry.

FRANK G. WHEATLEY, A.M., M.D.,
Professor of Materia Medica and Therapeutics.

GEORGE A. BATES, D.D.S.,
Professor of Dental Histology.

JOHN C. MUNRO, A.B., M.D.,
Professor of Surgery.

CHARLES A. PITKIN, A.M., Ph.D.,
Professor of Chemistry.

FREDERICK M. HEMENWAY, D.D.S.,
Professor of Mechanical Dentistry.

TIMOTHY LEARY, M.D.,
Professor of Pathology and Bacteriology.

JOSEPH KING KNIGHT, D.D.S.,
Professor of Prosthodontia.

GEORGE V. DEARBORN, A.M., M.D., Ph.D.,
Professor of Physiology.

OTHER INSTRUCTORS.

WALTER I. BRIGHAM, D.D.S.,
Lecturer on Operative Dentistry.

BYRON H. STROUT, D.D.S.,
Lecturer on Operative Technics and Instructor in Anesthesia.

GEORGE C. AINSWORTH, D.D.S.,
Instructor in Orthodontia.

WILLIAM P. HOUSTON, D.D.S.,
JOHN W. FORBES, D.D.S.,
EDGAR O. KINSMAN, D.D.S.,
JAMES R. PIPER, D.D.S.,
KNUT J. LUTROPP, D.D.S.,
HENRY H. PIPER, D.D.S.,
WILLIAM RICE, D.D.S.,
BURLEIGH C. GILBERT, D.D.S.,
ERVIN A. JOHNSON, D.D.S.,
Instructors in Clinical Dentistry.

FRED C. MERRILL, D.D.S.,
EDWIN A. QUINN, D.D.S.,
Instructors in Mechanical Dentistry.

EUGENE THAYER, M.D.,
Demonstrator of Anatomy.

JOHN I. FRENCH, M.D.,
Instructor in Materia Medica and Therapeutics.

Entrance examinations will take place Tuesday, October 2, at 10 A.M.

Registration of students closes October 13, according to the requirements of the National Association of Dental Faculties, of which this school is a member.

For further information or catalogues address the Secretary,

CHARLES P. THAYER, A.M., M.D.,
74 Boylston Street, Boston, Mass.

Philadelphia Dental College and Hospital of Oral Surgery.

EIGHTEENTH AND BUTTONWOOD STREETS.

FACULTY.

S. H. GUILFORD, A.M., D.D.S., Ph.D., *Dean*, Professor of Operative and Prosthetic Dentistry and Orthodontia.

S. B. HOWELL, A.M., M.D., D.D.S., Professor of Chemistry, Physics, and Metallurgy.

THOMAS C. STELLWAGEN, M.A., M.D., D.D.S., *Secretary*, Professor of Physiology.

L. GREENBAUM, M.D., D.D.S., Professor of Materia Medica, Anesthesia, and Odontotechny.

HENRY C. BOENNING, M.D., *Treasurer*, Professor of Anatomy and Surgery; Surgeon to the Oral Clinic.

—— ——, Professor of Dental Pathology and Therapeutics.

OTTO E. INGLIS, D.D.S., Special Lecturer on Dental Pathology and Therapeutics.

H. H. BOOM, M.D., Lecturer and Assistant to Chair of Chemistry.

INSTRUCTORS.

OTTO E. INGLIS, D.D.S., Demonstrator of Operative Dentistry and Dental Therapeutics.

J. W. MOFFITT, D.D.S., Demonstrator of Prosthetic Dentistry, Block and Continous-Gum Work.

GEORGE A. MAGEE, D.D.S., Demonstrator of Operative Dentistry.

W. H. DOLMAN, D.D.S., Demonstrator of Prosthetic Dentistry, Crown- and Bridge-Work.

THOS. J. McLERNON, D.D.S., Demonstrator of Operative Dentistry.

H. E. LATHAM, Assistant Demonstrator of Porcelain Work.

W. WALLACE FRITZ, M.D., Demonstrator of Anatomy.

H. AUGUSTUS BACON, M.D., Chief Assistant to Surgical Clinic; Demonstrator of Histology and Bacteriology.

T. C. STELLWAGEN, Jr., D.D.S., Assistant in Oral Surgical Clinic.

HENRY A. ELTZ, D.D.S., Assistant in Oral Surgical Clinic.

C. P. FRANKLIN, M.D., Assistant in Oral Surgical Clinic.

CHARLES F. WILBUR, D.D.S., Demonstrator of Dental Technics.

FRANK DAYMENT, R. W. VAN WAGNER, Assistant Demonstrators of Dental Technics.

CLINICAL INSTRUCTORS.

James McManus, D.D.S.
C. E. Francis, D.D.S.
H. C. Register, M.D., D.D.S.
F. D. Gardiner, D.D.S.
W. G. Chase, D.D.S.
Daniel N. McQuillen, D.D.S.
J. A. Bolard, D.D.S.
W. J. Magill, D.D.S.
R. L. Davis, D.D.S.
Joseph P. Wyman, D.D.S.
S. Eldred Gilbert, D.D.S.
S. B. Luckie, D.D.S.
Hayes A. Clement, D.D.S.
W. N. Daniels, D.D.S.
D. N. Merrill, D.D.S.
Howard E. Roberts, D.D.S.
James R. F. Fitzpatrick, D.D.S.
Comly Shoemaker, Faculty Clerk.

The College Year begins with the Spring Session, May 6, which session continues until the middle of June. The Winter Course commences October 4, and closes early in the ensuing May. A preliminary Fall Course opens September 3.

The Dispensary and Laboratory are open all the year, except during July and August. Instruction in PRACTICAL DENTISTRY is a prominent feature of the institution. This work is under the supervision of an executive committee composed of the practicing dentists of the Faculty, the members of which, aided by competent Demonstrators, give special attention to the interests of students. The Dispensary consists of large, well-lighted rooms, furnished with comfortable operating-chairs, tables, and all conveniences, so that the opportunities here presented for acquiring a knowledge of clinical dentistry are ample and complete. The new laboratory is the largest of its kind in the country. A clinic in ORAL SURGERY is held every Saturday at 12.30 P.M.

Special clinics for the study and treatment of Diseases of the Teeth are held twice weekly by Profs. Stellwagen and Greenbaum, and on Crown- and Bridge-Work Wednesdays and Saturdays at 8 A.M. by Prof. Guilford.

Entrance.—Candidates who have a collegiate degree or who have passed the matriculate examination of a recognized dental school, or such as possess a certificate of one year's attendance in a High School, may enter without examination. All others must pass an equivalent examination in arithmetic, grammar, geography, history, and physics.

Examinations. FIRST YEAR.—Progress in Anatomy, Physiology, Chemistry, Histology, and Bacteriology. SECOND YEAR.—Progress in Prosthetic and Operative Dentistry, Materia Medica, Anesthesia, Pathology and Therapeutics, Final in Chemistry, Anatomy, Physiology, Histology, and Bacteriology. THIRD YEAR.—Final in Prosthetic and Operative Dentistry, Dental Pathology and Therapeutics, Materia Medica, and Anesthesia.

Graduation.—Attendance on three courses of Lectures and satisfactory examinations in theory and practice are required for graduation. Graduates in medicine and pharmacy are eligible for graduation in Dentistry after attendance on Lectures and Clinical Service during two courses. These are excused from examination on subjects previously passed.

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Fees.—Tickets for each course, including the Demonstrator's, $100; Matriculation, inclusive of Syllabi for home study, $5 for each course; Examination and Diploma Fee, $35. Board $4 to $6 per week.

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Session 1899-1900. The regular Winter Session will begin October 1, 1899, and continue until May 1, 1900.

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The Regular or Winter Session begins about the first of October and ends April 30. The Infirmary opens October 1 and closes July 1.

FEES.

Annual Tuition Fee...$100

There are no other Charges or Extras of any kind whatever.

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Commencing October 1, 1895, women will be admitted to this College, subject to the same requirements as men.

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TERMS OF GRADUATION.—Attendance on three winter courses of lectures in this College; as equivalent to one of these we accept one course in any reputable dental college. Graduates in Medicine can enter the Junior Class.

FEES.—Matriculation (paid only once), $5.00. Tuition fee, $100.00 Diploma fee, $30.00. Dissecting fee, $10.00.

Students corresponding with the Dean will please be careful to give full address, and direct their letters to

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The 19th Session will open Monday, September 3, 1900, and will close May 31, 1901. No student can be admitted after September 13.

The examination for admission will be held at the new college building, Friday and Saturday, August 31 and September 1, 1900.

REQUIREMENTS FOR ADMISSION.—A certificate of admission to the third year of a regular high school course (including one year's study of Latin) or an equivalent. Lists of studies accepted as equivalent will be furnished on application.

N. B.—For the Session of 1901-1902 and thereafter, three years of high school work, including one year's study of Latin, will be required for admission.

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FEES.

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Tickets for each course, including Laboratories	100.00
Dissecting fee	10.00
Diploma fee	25.00

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Begin	September 24
Close	October 19
Examinations for advancement begin	September 24
Close	October 19
Opening of regular session, 8.30 A.M	October 9
Matriculation for full regular session closes	October 19
Practitioners' Course begins	February 15
Practitioners' Course ends	March 31
Final Examinations begin:	
Senior Class	April 22
Junior and Freshman Classes	April 29
Contests for graduation medals in Operative and Prosthetic Dentistry begin	April 29
End	May 4
Clinic closes	May 5
Commencement Exercises	May 6
Practical Clinical Dentistry Course begins	June 17
Ends	October 8

For further information and announcement, address

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J. NEWTON ROE, A.M., Sc.D., Professor of Chemistry and Metallurgy, Valparaiso, Ind.

E. J. PERRY, D.D.S., Professor of Prosthetic Dentistry, Stewart Building, Chicago.

CARL BECK, M.D., Professor of Bacteriology and Surgical Pathology, 100 State street, Chicago.

TOPICAL STATEMENT OF WORK.

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During the Freshman year the studies taken up are: Theoretical and Practical Chemistry, Anatomy, Physiology, Materia Medica, Dental Anatomy, Histology, Operative and Prosthetic Technics, and Operative and Prosthetic Dentistry.

Recitations in this course are conducted daily in commodious rooms specially arranged for this method of teaching. Stated lessons assigned from approved text-books supplement the didactic lectures and work in the laboratories.

SECOND YEAR.

During the Junior year students complete the work in Anatomy, Physiology, Chemistry, Histology, Pathology, and Bacteriology, and Materia Medica. In addition to this they receive instruction in Comparative Dental Anatomy, Crown- and Bridge-Work, Regulating Appliances, Splint and all kinds of Plate Work, and operate in the Infirmary.

THIRD YEAR.

During the Senior year the students listen to lectures on Oral Surgery, Therapeutics, Operative Dentistry, Dental Anatomy and Pathology, Orthodontia, and attend Clinics. In addition to the lectures each student is required to operate in the Infirmary and perform practical work in the Laboratory.

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